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INDEX

An index to the ninety-first volume of THE RAILWAY GAZETTE *covering the issues from July 1 to December 30, 1949, has been prepared, and is now available free of charge on application to the publisher.*

Increased Freight Charges Recommended

LAST week, the permanent members of the Transport Tribunal sitting as a Charges Consultative Committee under Section 82 of the Transport Act, 1947, issued their report endorsing the application by the British Transport Commission for an increase of 16⅔ per cent. in railway freight charges. They also recommended in a second report the higher rates claimed in respect of canals and docks. There has been no indication so far as to what action, if any, the Minister of Transport may take in the matter, and he is under no obligation to implement the report. During the inquiry the main opposition came from the British Iron & Steel Federation which suggested that economies a good deal in excess of the £2,000,000 to £3,000,000 allowed for should be realisable. Though, states the report, the estimated economies for 1950 were disappointingly small, there was no justification for disputing the B.T.C. figures, which it could be assumed had been prepared by those best able to foresee what economies it would be possible to achieve. One important issue debated was whether the conditions likely to be responsible for a loss of £30 million in 1950 would continue for some time, and the conclusion was reached that at present charges the deficit in 1952 would not be materially less than in the current year. Therefore, despite the fact that the proposed increase, if granted, must be reflected in some advance in the cost-of-living index, postponement of an increase until such time as the Charges Schemes were brought into force was considered inadvisable.

British Locomotive Engineers and Africa

IN opening up the vast spaces and great resources of the continent of Africa, railways played a basically important part and the contribution which has been made by British locomotive engineers and manufacturers has been noteworthy. Some impressive figures relating to the supply of motive power to the Union of South Africa alone were given by Mr. Leif Egeland, the High Commissioner for South Africa, at the annual luncheon of the Institution of Locomotive Engineers last week. The Institution enjoys a high reputation for the number and quality of members and guests who attend this annual function. The last occasion was no exception; with an attendance of 563 members and guests it established a record. The President, Mr. W. Cyril Williams, is an outstanding and popular personality in railway circles in many parts of the world. His close association with Africa dates back to his childhood in the Union. His world-wide travels and his detailed knowledge of overseas railway affairs well merit the similes, indulged in at the luncheon, to the Garratt locomotive, towards the development and use of which he has done so much. Mr. Egeland, in a happy turn of phrase, described him as "a globe-trotter, whose articulateness was only exceeded by his mobility."

Institute of Transport Annual Dinner

ON Friday last the Institute of Transport held its annual dinner at the Connaught Rooms, London, W.C.2. Brigadier-General Sir H. Osborne Mance, the President, was in the Chair and there was a large attendance of past-Presidents, Members of Council, members, and guests. The last-named included several visitors from overseas. Sir Cyril Hurcomb, Chairman of the British Transport Commission, and Sir Reginald Hill, Chairman of the Docks & Inland Waterways Executive, were among those who attended. All forms of transport were represented. As always on these occasions, the proceedings were informal and the only speech was a brief address of welcome by the President. The dinner was followed by a dance. The gathering provided an excellent opportunity for informal contact between representatives of all arms of transport, and as it is always attended by a number of those who have retired from an active part in their particular branches of the industry, it was a means of enabling them to indulge in an exchange of views and the pooling of experience. Many of those present had already attended the annual luncheon of the Institution of Locomotive Engineers, earlier in the day, but the co-incidence of the two annual functions on Friday last in no way deflected from the success of the Institute dinner.

Transport Co-ordination in Northern Ireland

IN recent issues, notably that of February 10, we have referred to the progress which the Ulster Transport Authority has made since it was established in October, 1948. Last Monday, at the Institute of Transport, Mr. J. Courtney, Chief Engineer, and Mr. J. W. Hutton, Chief Traffic Manager, of the Authority, presented a paper on "Progress in the Co-ordination of Road and Rail Transport in Northern Ireland." This showed that, although the Authority has made some progress, much remains to be done. The area served is relatively small; it is of some 5,238 sq. miles and has a population of 1,348,000, of whom about one-third live in Belfast. The longest road haul is about 110 miles, but most of the country's industry is concentrated in a belt running 40 miles inland from Belfast to Dungannon, apart from the shirt industry centred in Londonderry. In 1940 the Northern Ireland Road Transport Board—the predecessor of the Authority—had a fleet

of 493 buses and 651 lorries. The Authority operates approximately 1,000 of each, which gives a measure of the increase of road passenger travel. It has no monopoly, for its vehicles compete with 16,000 privately-owned lorries and 13,714 agricultural tractors. In addition, there are 40,000 private cars and 1,300 taxis operating in Northern Ireland. The trader has complete freedom in the operation of his own traffic.

Progress Achieved

AMONG the steps taken to co-ordinate passenger services have been the curtailment of bus services where both bus and train services are provided; Sunday services have been withdrawn or reduced on several sections of railway and bus services substituted, and trains and buses have been re-timed to give connections at important centres. Season tickets available for part journey for road and part by rail are issued, and bus and rail return tickets are valid for return by the alternative means of transport. Although bus fares are slightly higher generally than rail fares, there has been a tendency for road traffic to increase; this has resulted in the policy of closing non-paying sections of railway. On the freight side, the policy of directing traffic by the most economical method of transport is being energetically developed. Many road freight depots are being transferred to railway stations and the integration of road and rail staffs has secured economies. A unified charges structure is in preparation, but cannot be completed until all the economies to be effected from full co-ordination have been achieved. Among the physical experiments being tried is the use of a special trailer, hauled by road tractor unit and adapted for side loading on to a railway wagon, with the object of obtaining the benefits of the cheaper haulage by rail without the disadvantages of double handling.

Southern and Scottish Region Punctuality

DURING the four weeks ended December 3, 1949, there was a slight deterioration in the punctuality of steam and electric trains on the Southern Region. Passenger steam-train arrivals were an average of 1·88 min. late on weekdays, a 21 per cent. increase over the corresponding figure for 1948, but 19 per cent. better than the 1947 result. The corresponding decline in electric train punctuality amounted to 13 per cent., but arrivals were slightly better than for 1947. Commenting on the results in the Southern Region edition of the *British Railways Magazine*, Mr. S. W. Smart, Superintendent of Operation, says that during the period under review punctuality was adversely affected by fog on six days in November, as well as by engineering works in Bopeep Tunnel; timekeeping otherwise would have been as good as, if not better than, in the corresponding period of 1948. Results for the latest period are shown below:—

AVERAGE MINUTES LATE ARRIVAL (WEEKDAYS)

	Four weeks ended				
	1945 Dec. 29	1946 Nov. 30	1947 Nov. 29	1948 Nov. 27	1949 Dec. 3
Steam	8·06	2·36	2·32	1·55	1·88
Electric	4·97	1·93	2·42	2·09	2·36
Freight	25·6	9·8	9·3	5·0	5·3

An analysis of local passenger train timekeeping in Scotland for the four weeks ended February 25 showed that, despite adverse weather conditions, 80 per cent. of the 54,971 trains run reached their destinations on time; 13·1 per cent. of the passenger train services were 5 min. late or less, and 6·9 per cent. were over 5 min. late.

Canadian National Capital Structure

ADJUSTMENT of the capital structure of the Canadian National Railways is imperative, according to a statement by Mr. Donald Gordon, Chairman & President, C.N.R., supplementing a submission to the Royal Commission on Transportation. Post-war inflation has seriously depleted reserves and it is considered that realistic capitalisation of the Canadian National has to be related to its future earning power. Mr. Gordon believes that to show operating results which will meet commercial tests the amount of interest-bearing capital which may be included in a restatement of the capital structure should be relatively small. The C.N.R. suffers from being a merger of formerly competing lines, and though redundant lines have been abandoned or reduced in status, there remains an estimated annual operating disability of more than $8,000,000 under this head. A large capital is represented by developmental and unremunerative lines. The whole burden totals $1,533 million and $804 million represents interest-bearing obligations from insolvent railways taken over. It is submitted that the capital should be readjusted so that the $760 million of interest-bearing obligations held by the Government should be exchanged for equity capital, that the Government should contribute $300 million to bear 3 per cent. interest, and that future development lines should be financed to only 60 per cent., with the remaining cost borne by the Government.

Transport Consultation Machinery

WHEN the British Transport Commission issued its first annual report last year a special eight-page edition of *Transport News* was prepared for distribution among the 900,000 members of the B.T.C. staff. This edition, which embodied the principal features of the report and was commented on in our September 16, 1949, issue, was very well received by all sections of the staff. A second edition has now been produced and deals with staff relations, including recent developments in agreement between the Executives and the unions, and examples are given showing how consultation is resulting in greater economy and efficiency. Mr. John Benstead, Deputy-Chairman, B.T.C., describes both the formal and informal methods adopted to provide the information needed by the staff in playing their part in making consultation a success, though he emphasises that, while views backed by facts and knowledge and experience are always welcome, "whatever views are expressed, management must manage."

Signalling Developments in France

REFERENCES in the French technical press show that a considerable amount of new signalling work is being carried out by the French National Railways. It incorporates all the features met with in the most recent developments in other countries, which have given rise to much discussion from time to time. Most of this important work has been done on the old P.L.M. route between Paris and Dijon, which has been electrified. According to an interesting article in *Notre Métier* recently there have been installed on this section during 1949, 13 relay interlocking signal boxes, six ordinary route-lever type boxes—called now in France the "classic" type—and 16 others fitted with the standard electro-mechanical arrangement, having ordinary levers for the points and miniature ones, mounted over them, for controlling the signals. In addition, automatic track circuit signalling has been installed on 130 miles of double line, about 12½ of which have both-way working on each track, and 86 miles of existing automatic signalling have been changed from d.c. to a.c.

Locomotive Fuel in the U.S.A.

DURING 1949 the supply of diesel fuel oil in the United States increased substantially, and from 1948 to 1949 there was a drop of about 10 per cent. in price. As a result, whereas locomotive coal today costs 117 per cent. more than in 1939, the diesel fuel oil increase has been only 104 per cent. The principal change, however, has been in the supply of residual fuel oil of the type used for oil firing on steam locomotives, which is becoming almost a glut on the market, its price being little more than one-quarter of what it was two years ago. As a result, the conversion of steam locomotives to oil firing has accelerated considerably, and both in this field and in the field of diesel-electric propulsion the trend from coal to oil is unceasing. Moreover, the change has a double advantage, as, besides reducing the costs of operation, it is progressively freeing the railways from the menace of stoppages of work in the coalfields.

Identification of Motive-Power Depots

SO that the home depot of a locomotive may be readily identified British Railways has completed a system of code numbers and letters for all Regions. Each locomotive will carry the code of its owning depot on a cast-iron plate affixed at the base of the smokebox door. Until now, there have been various systems in use, each a perpetration of those existing before nationalisation. The G.W.R. usually painted an abbreviated form of the shed name on the locomotive frames, and on the L.N.E.R. depots were indicated by a plate inside the cab, or by a series of letters painted on the buffer beam. A comprehensive system was in use on the L.M.S.R. and has now been accepted by British Railways for its whole system. It has been necessary to amend some of the former L.M.S.R. codes in the light of the formation of the Scottish Region and other Regional changes. As was pointed out in our issue of February 17, however, the revision of Regional boundaries to come into force on April 2, in most cases does not affect existing operating motive-power districts, divisions, and Regions, and the new identification system has consequently been prepared in accordance with these arrangements.

Transport Debated in Both Houses

ON March 15 both the House of Lords and the House of Commons debated transport. The Peers had before them a motion on the British Transport Commission's policy, introduced by Lord Teynham, and in the Commons, Mr. Peter Thorneycroft opened the transport debate in Committee of Supply. Naturally enough, speakers in both Houses were concerned at the heavy losses which are accumulating on the operations of the British Transport Commission and in particular in relation to its railway undertakings. The report and accounts of the British Transport Commission in respect of 1949 is not likely to be available for some time yet, but Lord Teynham reminded the peers of figures, which had been given by the Minister of Transport and others, which suggested an accumulated deficit for 1949 of some £50 millions rising, perhaps, to as much as £100 millions by 1952. He was concerned to obtain a full statement of policy as to the means by which the British Transport Commission intended to deal with the grave situation which has arisen and which is continuing.

As labour represents the greatest factor in costs on the railways he was strongly in favour of concentrating a good deal of attention on the introduction of mechanical handling methods with a view to effecting economies, and he hoped that the Government would initiate a real drive to secure major savings in administration. Other speakers in the debate gave numerous instances of means by which they thought greater economy and efficiency could be secured. One suggestion was that coal costs were unduly onerous to the railways when the quality of fuel supply was considered, and the view was expressed that if the railways were enabled to get the coal they wanted they could save several million pounds a year in that direction alone. There was also a good deal of concern at the increased numbers of men employed on the railways as compared with pre-war days and at the prospect of further increases in charges.

Lord Lucas of Chilworth, who was making his first speech as Parliamentary Secretary to the Ministry of Transport, dealt at some length with the very grave difficulties with which the railways are faced as the result of Government policy on the restriction of capital investment. He pointed out that the bare minimum replacement of locomotives to keep the stock in sound condition was 400 a year. The average replacement life of locomotives was having to be extended from 33½ years to 40 years. The position was worse now than before the war. The use of old locomotives increased working expenditure and the cost of repairs. More than 8,000 carriages now in use are over 35 years old, and since September, 1948, £320,000 has had to be spent on heavy repairs to 700 carriages over 40 to 50 years old, so as to give them a further three to six years of service life. The wagon position is even worse and Lord Lucas admitted that there was a risk of shortage by the autumn.

He then went on to say: "I make no complaint about that restriction," referring to the restriction on capital investment. That is an extraordinary statement to come from a responsible representative of the Ministry of Transport. He had already made it clear—indeed it was the whole tenor of his opening remarks—that the policy of restriction on so-called capital investment was short-sighted and was in fact calculated to cause not only a decline in railway efficiency at the present time and over the next few years, but also to result in a greater aggregate expenditure in the end, and with less to show for it, than if reasonable renewals were undertaken. We have previously suggested that the Ministry of Transport must shoulder the ultimate responsibility for the effects of implementing Government policy in this respect. For the Parliamentary Secretary to come to the House of Lords and say that he has no complaints about the working of this policy would seem to suggest that the Ministry is not as yet fully aware of the inevitable outcome of the Chancellor's policy.

The debate in the House of Commons naturally in part duplicated that in the House of Lords. Mr. Thorneycroft strongly urged the decentralisation of responsibility for the administration of the railways and suggested that the Chief Regional Officers should be given the maximum freedom in evolving policy for the profitable running of their line and then for putting it into effect. Other members supported Mr. Thorneycroft in these suggestions, and Mr. Geoffrey Wilson, who before nationalisation was an Assistant Solicitor in the Legal Department of the Great Western Railway, was critical of the number of changes for change's sake which have been effected since nationalisation. He believed, and there will be many in the railway service who share his view, that these tended to spoil corporate unity and to destroy tradition and sentimental attachment to the railways. He thought, too, that there was a dangerous gap between the British Transport Commission and the Railway Executive, and an even greater one between the Railway Executive and the Regions.

Mr. Alfred Barnes, the Minister of Transport, on behalf of the Government, maintained that the nationalisation of the railways had been followed by very considerable economies, but that as they had accrued they had been absorbed by rising expenditure. He maintained that the work of the British Transport Commission had justified itself, and, if it was given time to develop, it could solve the problem of road and rail in this country. He rejected any suggestion that decentralisation could touch the financial problem and said that making decisions on the spot would not provide the railways with physical assets. On the other hand, it could equally well be argued that the most efficient and remunerative use of existing physical assets might be assisted by more immediate decision as to their use. He admitted that the provision of modernised physical assets were essential to the economic well-being of the railway and instanced the electrification of the line to Shenfield, as a result of which passenger receipts had increased by as much as 40 per cent. and much traffic had been regained. In effect, therefore, he was supporting arguments which we have advanced in these columns against the implementation of the Government policy of restriction of capital investment, although he gave no indication whatever that he was prepared to argue against this policy with his Government colleagues.

The most unsatisfactory feature of the debates was the reiteration by the Government of its satisfaction with the general efficiency of the transport system as operated by the British Transport Commission in the present difficult circumstances. It acknowledged that these could not be judged satisfactory from the point of view of results, but it gave no indication whatsoever of any practical plan or guidance as to how conditions could be improved. For Government spokesmen to acknowledge the need for improved physical assets, in order to improve services and earning ability, and at the same time to be allied with a policy which prohibits expenditure on the provision of the very assets it admits are required, is not helpful.

Convention on Electric Traction

THIS week a four-day convention on Electric Railway Traction has been held at the Institution of Electrical Engineers during which papers have been read by representatives of the railways and of industry which will form a valuable pool of knowledge and experience. A full list of the papers was given in our December 23, 1949, issue, and a selection is summarised on other pages this week. Other papers will be dealt with in future issues. In another editorial article we comment on the major points of interest emerging from some of the papers. The timing of the convention was opportune, for interest in main-line electrification possibilities was stimulated by personal views on the future of electric traction for main lines expressed last year, both by Sir Eustace Missenden and Colonel Harold Rudgard. Moreover a group of railway officers appointed by the British Transport Commission is now studying the recommendations of the Pringle Report on Standardisation in the light of developments since the Railway (Standardisation of Electrification) Order was made in 1932.

The convention was opened by Professor E. B. Moullin, M.A., Sc.D., M.I.E.E., President of the Institution, who welcomed the presence of visitors to the convention from overseas whose experience of climatic and physical conditions different from those experienced in Great Britain would add to the value of the discussions. The conception of this convention dated from some four years ago, when the Traction Technical Committee was reviewing the position of railway electrification and the possible effect of nationalisation. It was decided that the time had come to discuss existing practice and to make public developments in design of rolling stock and equipment.

Sir Cyril Hurcomb, whose speech is summarised elsewhere in this issue, said that although the report of the committee studying the Pringle recommendations had not been published, it could be assumed that the 1,500-V. overhead system would be used for future electrification outside South-East England, where the conductor rail would be retained. While this conforms with general expectations it will be interesting to see what the report when finally published has to say on 3,000-V. d.c. in the light of modern improvements to high-voltage motors. British manufacturers have been prominent in this direction. In fact, the paper by Mr. E. T. Hippisley on British achievements overseas quoted seven systems abroad to which 3,000-V. d.c. locomotive and motor coach equipments had been supplied since 1924. British 3,000-V. d.c. substation equipment had gone to railways in Poland, South Africa, Brazil, and Chile.

Mr. C. M. Cock, Chief Electrical Engineer, Railway Executive, followed Sir Cyril Hurcomb's speech with a consideration of some economic aspects of electrification in the light of important modern developments. There were now possibilities of retaining the advantages of high-voltage a.c. transmission without using single-phase commutator motors for traction. Experiments in the U.S.A. had demonstrated that it was practicable to convert a.c. to d.c. by means of mercury-arc rectifiers in the locomotives or motor coaches themselves. Another important development was the use of high-voltage single-phase 50-cycles energy in the contact line. This system, although in the experimental stage, was attractive in that it reduced to a minimum the cost of the fixed installation. Power was taken direct from the grid with traction substations in their most simple form, *i.e.*, a step-down transformer instead of expensive and inefficient rotating machinery for frequency changing. Here this development might make possible the electrification of branch lines which could not otherwise be electrified economically.

A difficulty had been the production of a suitable 50-cycle single-phase motor, but the design of such motors had been improved. The French National Railways intended to carry out experiments with up-to-date and improved 50-cycles locomotives on an experimental line 55 miles in length from Aix le Bains to La Roche sur Furon.

The multiple-unit train was now a thoroughly reliable means of transportation and this had been brought about by continual and progressive improvements in the design of the traction motors and control gear. As an instance of their consistent reliability the Southern Region recently reported a four-week period of 0.48 failures per 100,000 car-miles or roughly one mechanical or electrical failure per coach every two years.

Mr. Cock referred in conclusion to the research still necessary to determine precisely the effect of the axle-hung motor on the track. It was known that with electric traction the increased traffic and the multiplicity of driving axles increased general wear and tear on the track, but until proper research was brought into this problem, it was difficult to get at the root trouble that was detrimental to the track.

Electric Traction Problems and Practice

YEARS of operating experience with steam have allowed the civil engineer to determine with certainty its effects on the track. The paper by Dr. F. G. Johansen to the Electric Traction Convention attempts an interim assessment of the effects of electric traction, and he finds that electrified track deterioration is almost entirely of mechanical origin, accentuated by intense traffic and similarity in design and operation of trains embodying power bogies with axle-hung motors. The effects of track damage are cumulative and are enhanced by maintenance difficulties due to the frequency of service and the presence of the live conductor rail. Particular reference is made to side cutting, the origin of which lies in the wavelength of oscillation of an axle or bogie having coned wheels, rolling on tangent track. As this wavelength is dependent on wheel coning and other factors numerically similar for standard train units, it is clear that there is a tendency for all units of a standard type to create identical side cutting as they oscillate. The increased wear as compared with steam operation is, however, compensated by, and is mainly due to, the greatly increased track use and standardisation of trains.

One of the principal problems of the locomotive or motor coach builder is to determine the correct power to fulfil a specified performance. Although specifications usually state a performance, it is rather the exception than the rule to have a train resistance figure given; the choice is left to the designer who has a bewildering variety of formulæ from which to chose. Mr. F. Lydall reviewed and compared many of the better-known formulæ in use in Great Britain, U.S.A., Germany, and Italy, and gave values for the types of rolling stock which represented a fair compromise between them. The Davis formula is frequently criticised on the ground that it makes no allowance for conditions other than still air, and one of the most important parts of this paper dealt with variation in tractive resistance due to an external wind meeting the train at different angles. A calculation based on weather charts during the first six months of 1949 indicated that the average air resistance on trains running at 60 m.p.h. to and from Manchester would be about 65 per cent. greater than in still air. Other points covered included the effect of open carriage windows, additional resistance in tunnels, and the effect of streamlining.

The paper on control and auxiliary equipment for direct-current electric locomotives by Mr. R. Brooks discussed the principles of electric locomotive design in some detail. A particularly valuable section was that dealing with electro-pneumatic contactors and the mechanism of propagation and extinction of the arc. Mr. Brooks also commented on interlocks with examples of the methods used in preparing a locomotive scheme. This paper should be of great value to engineers in other traction fields.

Another valuable addition to a field in which the literature is sparse was the paper by Mr. P. L. Mardis and Mr. W. G. Jowett on equipment for diesel-electric locomotives and motor coach trains. This paper was divided into three parts, covering general requirements, transmission equipment, and installations. It is, perhaps, permissible to query the dismissal of series-parallel grouping for main-line locomotives, and, although there is good

ground for the suggestion that little is saved in generator weight for a given performance, it seems that for locomotives of the mixed-freight and passenger type two alternative performance ranges could be obtained by grouping. According to Hinde the 350-h.p. diesel-electric shunters supplied to British Railways are provided with links to give two alternative motor groupings; they can thus be grouped in the sheds by altering the links according to the duty for which they are required. In view of the large and continuing proportion of U.S.A. main-line diesel-electric locomotives fitted with series-parallel grouping it might be worth while to investigate the matter further.

Engineers who consider the economic implications of their problems with more than a passing thought are not as common as one might wish. It is all the more interesting therefore to study the paper on electric braking systems by Mr. F. Whyman in which the essentially economic character of the decision to adopt electric braking was emphasised. The author was satisfied that for locomotives electric braking should be seriously considered where more than 10 or 15 per cent. of the route-mileage has a gradient of 1 in 150 or steeper. For motor-coach trains he made an interesting calculation to show that, since to obtain full advantage from electric braking all axles must be motored, the interest and depreciation charges on the extra capital cost would exceed the amount saved in reduced energy consumption, tyre wear, and the like. Such calculations are valid only for the depreciation policy of a particular railway, but the economic principle remains. Mr. Whyman considers that the best form of regenerative braking is mechanical—raising stations 25-35 ft. above normal running track level and thereby providing braking at the entry to a station and acceleration due to gravity on leaving.

Locomotive designers have little opportunity to consider the details of the supply system. Several papers were given on this subject, covering such matters as conductor rails and their ancillary equipment, design of overhead equipment, overhead equipment of the Melbourne suburban electrified railways, and the spacing of substations. These papers, combining principles and established practice, provide useful information on which to base preliminary schemes for an electrified system.

Mr. W. J. Webb presented a paper on substation spacing which contained a passage worthy of special note by all traction motor designers. He said: "High-voltage contact systems are usually operated with single-phase alternating current, and in such instances the substations are widely spaced and are very simple, being little more than static transformer stations." This comment underlines the omission of any reference to single-phase a.c. machines from the paper on modern traction motors and gearing by Mr. G. H. Fletcher and Mr. E. A. Binney. Two important advances made recently in Continental practice involved respectively the use of single-phase 50-cycle motors and the use of d.c. series motors in which field weakening is carried down to as low as 23 per cent. full field. It was disappointing that a paper which otherwise gave a full review of modern practice should have omitted reference to these points.

In a paper dealing with control gear and auxiliary machines for d.c. multiple-unit electric trains, Mr. E. T. Hippisley and Mr. F. E. Butler reviewed present practice and more recent developments in the design, grouping, and mounting of multiple-unit control equipment. One particularly interesting feature of this paper was a note on a special provision to meet fluorescent lighting requirements. It is well known that a frequency of 400-800 c./sec. is preferable for fluorescent lighting, and one method of providing this is to add a poleface winding on the generator of the motor generator set.

Two matters of some importance seem to have received little or no notice. In relating performance to available axle loading, the available adhesion is of prime importance, and beyond a brief reference to "adhesions below 20 per cent. in adverse climatic conditions" no considered views have been put forward. The second point, relating to the first, concerns weight transfer which is a problem peculiar to bogie vehicles. Little mention has been made of this important matter or of bogie design either on locomotives or motor coaches.

The Pacific Great Eastern Railway

TWO recent events have brought into world news the Pacific Great Eastern Railway in British Columbia. One is the decision of the British Columbia Government to place an order for £1,800,000-worth of rails and other steelwork in Great Britain for a northerly extension of this railway, as reported in our issue of December 9, 1949. The other is the proposal that the existing railway and the extension should form a link in an important strategic chain of railways between the United States Pacific Coast and Alaska. It would run *via* Seattle, Vancouver, a new 30-mile rail link onwards to Squamish, the existing P.G.E. line from Squamish to Quesnel, the extension in hand from Quesnel to Prince George—on the Canadian National transcontinental line to the Pacific port of Prince Rupert—a further proposed extension from Prince George to Dawson Creek in the Peace River basin, and then, presumably, following more or less closely the strategic Alcan Highway to Fairbanks, Alaska.

The existing P.G.E.R. begins at Squamish at the head of Howe Sound north of Vancouver, with which it is connected by a daily steamer service. It runs northwards through Lillooet, Clinton and Williams Lake to Quesnel, the present terminus, a distance of 347 miles, and traverses some of the most beautiful country in Canada. Originally, it was intended to form the outlet for the Grand Trunk Pacific Railway—now a constituent of the Canadian National system—to Vancouver by connecting Prince George with Vancouver *via* Quesnel and Squamish. The P.G.E.R. Company was incorporated in 1912 to construct and work this 470-mile connection.

By 1916 the formation of the 428 miles from Prince George to Squamish and of 13 miles north of Vancouver, towards Squamish, had been completed. In 1915, 13 miles of line were opened for traffic, but the contractors then failed and the British Columbia Government had to take over the property. Although, the railway was completed and opened for traffic from Squamish as far as Quesnel in 1921, rails were never laid onwards to Prince George. Consequently there has been no through traffic from the C.N.R., and the P.G.E.R. has been run at a loss. It is hoped that when the extension to Prince George is in operation the financial situation will greatly improve, and that the further proposed extension to the Peace River on the border of North-Western Alberta will make the P.G.E.R. a profitable undertaking.

From Squamish the railway runs first through mountains, forests and a lake district to Lillooet, where variety is provided by orchards and farm land. The Fraser River valley is then traversed amid well-wooded mountains to the more open Cariboo cattle-raising country and the great "green country" around and beyond Quesnel. The scenery throughout the length of the line is considered finer than that seen from any trans-continental line through the Rockies, and game and fish are plentiful.

There is no great volume of traffic carried, freight consisting mainly of timber and local produce. Three passenger trains run throughout each way weekly, and consist of first-class coaches, dining-parlour cars, and standard-ten section sleeping cars; open observation cars are attached during the summer months. The time taken for the 347 miles is a little under 20 hr. In the first 37 miles from Squamish the line rises 2,100 ft., and then falls to 686 ft. near mile 62, whence there is another rise to 1,575 ft. in the succeeding 14 miles, and a somewhat similar descent in the course of the next ten. From mile 86 to Lillooet (mile 120 and 793 ft.) there is little rise and fall, but the big climb is from that point to Kelly Lake near Clinton, altitude 3,509 ft. and mileage 155. A plateau at over 3,000 ft. is traversed to mile 228, after which there is a gradual fall to Quesnel, 1,549 ft. above sea level; the Fraser River is closely followed in the last 58 miles.

The locomotive stock consists of 12 steam and five diesel engines, but all the steam locomotives are to be replaced as soon as convenient by six new diesels. A large programme of improvements is in hand, but as this is in connection with the extension to Prince George, details are included in an article dealing with that extension, its prospects, and possible further extensions, which appears elsewhere in this issue.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

U.S.A. Railways in 1949

March 10

SIR,—An article in your February 24 issue summarised Dr. J. H. Parmelee's review of U.S.A. railway operations in 1949. As the review was published in America on January 7, there was an element of estimate in some of the figures. A statement of the actual results, compiled about February 10, shows that operating revenues were 0·3 per cent. and expenses 0·6 per cent. higher than the estimates, but the operating ratio still stood at 80 per cent. Net railway operating income was 1·6 per cent. higher, yielding a return of 2·9 per cent. on property investment. The railways thus did a shade better than Dr. Parmelee thought they would, but it was a remarkable feat to forecast the financial position of 127 companies, operating about 227,000 route-miles, so closely.

Yours faithfully,

R. BELL

Frognal, N.W.3.

Eastern Region Electric Services

February 25

SIR,—The seating capacity of the nine-car electric trains into Liverpool Street is less by about half than that of the former ten-car steam trains. This should be compensated by the additional trains and the division of the train service into four separate groups.

Before electrification there were only eight Ilford line train arrivals between 8.30 a.m. and 9.23 a.m., supplemented by two additional trains from the Chelmsford line serving the Shenfield-Romford area, and one from Southend called at Ilford. There were two trains to Fenchurch Street between 8.50 and 9.20 a.m. There were therefore 13 trains arriving during the period 8.24 to 9.23 a.m. and this service is now replaced by an electric service of 18 trains between 8.24 and 9.22 a.m. (This is according to the November 7, 1949, timetable, but I understand that the full service of 21 trains was to be operated in January, that is, Ilford non-stops at 8.26, 8.46, 9.6 arriving at Liverpool Street, which were not running in November).

Before the war there were two trains starting at Ilford at 8.20 and 8.42 a.m. which ran non-stop to Liverpool Street. The electric train service now provides Ilford with the reinstatement of these facilities.

Yours faithfully,

W. A. SHEPHERD

Armadale, Victoria, Australia

1948 Locomotive Exchanges

February 8

SIR,—I am pleased to see that several influential correspondents have at last come to the rescue of Mr. Bulleid's designs.

I travel several hundred miles a week on the Southern Region and I spend much of my spare time observing locomotive work. Mr. Bulleid's Pacifics seem to leave little to be desired and only twice have I observed a failure of one of them. In both instances it was a "Merchant Navy" class, once a hot box and once shortage of steam due to bad coal, both failures of a type that could happen to any locomotive. A friend who works in one of the Divisional Controls states that failures of the Pacifics on the road are "below average." Another friend who is a driver at Exmouth Junction has never heard of a valve chain breaking but admits that the valve settings often get out of adjustment.

I think I am correct in saying that, now that a new oil with a higher flash point is used, oil bath fires have been all but eliminated. On the Western Section of the Southern Region these locomotives are quite popular with the crews, though the same does not seem to hold good on the Eastern Section where the "Schools" are still the most popular class. The Pacifics tend to be heavy on coal but are not unpopular with the fireman as they are easy to fire and steam freely. As a matter of passing interest, commencing this week the "Merchant Navy" class are being rostered to work between Exeter and London without locomotive changes at Salisbury.

Mr. Bulleid's designs may not be perfect but they represent a bold step in the right direction if the steam locomotive is to hold its own against its modern rivals. For that reason alone I hope that the "Leader" class will eventually prove a successful design. In the unhappy event of it proving a failure I hope full details of it will be published so that all engineers may benefit by the experience gained.

I am only a railway amateur and thus in a poor position to challenge Mr. Earle Edwards, a Southern Region Divisional Superintendent, but a usually reliable source of information informed me that Southern Region signalmen were instructed to give preference to local electric trains over main-line steam trains at junctions, particularly when the electrics are running late, due to the limited turnround times allowed to local electric trains at their terminal points. This method of operation is often to be seen here and at Surbiton.

Yours faithfully,

J. B. LATHAM

18, Wheatsheaf Close, Woking

Links Between Track and Train in A.T.C.

March 14

SIR,—I was very interested to read Mr. Mott's article on the above subject in your issue of March 10, and my only regret is that consideration of space, no doubt, prevented him giving more details of the various systems, as such information is not readily available.

I would like, however, to pass one or two comments, first on the magnetic system. The author rightly states that "there is an inherent weakness in relying on the continuity of an electric circuit on the track," but goes on to say that this feature is absent in the magnetic link. It seems to me that it only requires a platelayer to use the magnet housing as a convenient resting place for his spanner, or any piece of iron, and the magnetic link becomes inoperative. If this ever becomes the standard system on British Railways, one hopes the authorities will not forget to issue a suitable instruction to permanent way staff!

I do not think the author does full justice to the coded track circuit system on the score of cost. For the very reason that it requires continuous track circuiting, it safeguards against signalman's errors, and to give similar protection with the magnetic system would also require continuous track circuiting. (The two systems then become comparable in cost, and the coded track system is, one would imagine, much safer, if only for the reason given in my second paragraph.) After all, it is not much good telling a driver when a signal is at caution if the signalman is free to pull it, even though the section ahead is occupied, through the signalman ahead having incorrectly given "Line Clear."

On the question of radar possibilities, I think the problem of confining the pulses to individual tracks could be overcome by using different pulse frequencies for each track. Some little time ago I myself evolved such a system which (in theory at any rate!) had all the features necessary for a railway system in the event of "wrong side" failures, but it failed to arouse interest amongst the manufacturers. I think, however, that future developments are more likely to be along the lines of measuring the phase displacement between the frequency generated by an oscillator on the locomotive and the reflected echo, rather than in "pulse" technique.

The great advantages of a radar system from the Operating Department's point of view are too lengthy to

enter into here, but I feel that if the railway authorities were willing to engage the services of some of the great scientists who produced radar in the first place, and pay for the necessary development work, a satisfactory system could be evolved. In this way, our country could once again take the lead in signalling which it achieved in the last century through the ingenuity and initiative of the signal engineers of that day.

Yours faithfully,

D. DOWNES

124, Wynchgate, Winchmore Hill, N.21

Crewe Colours

March 9

SIR,—I notice that elderly South Eastern, Brighton, and South Western tanks are emerging from Ashford, Brighton, and Eastleigh in the now standardised L.N.W.R. colour scheme and, I presume, equally elderly passenger and mixed traffic locomotives are receiving the same treatment elsewhere.

Why, then, is Crewe, where this colour was born, making an exception of the surviving Webb tanks in this respect? The 2-4-2s are passenger locomotives and the Class 2E 0-6-2s are frequently used as such. Moreover, they are the only surviving L.N.W. classes which, by nature of their duties, are entitled to be restored to their old colours.

I suggest that there is more than a touch of irony in this situation and that a few of these useful little locomotives decked in their former livery for their remaining few years would be a sight for sore eyes.

Yours faithfully,

J. P. BARDSLEY

9, Berriedale Avenue, Hove 3

Railway Efficiency

February 1

SIR,—As I expressed in your January 6 issue the view that a disturbing inertia had existed in British railway development during the past half-century, it was interesting to examine this hypothesis in the light of the recent broadcast of Mr. Geoffrey Crowther's definition of an efficient firm one that is master of its environment, and not constantly overtaken by crises and compelled to improvise one expedient or another to solve them. It can produce things at a price which is always tempting the market to buy more. It can, on the one hand, pay steadily rising wages, and on the other attract plenty of capital to itself, so that its mechanical equipment is kept up to date, its productivity rises, its prices lowered still further, and wages increased.

By such a yardstick our railways have cut, and continue to cut, a sorry figure. Not only have their competitors tempted the market to purchase more of their product by "creating" traffic, but have made such devastating inroads into the railway market that the railways found themselves wandering in the traffic wilderness reduced to a state of mendicancy from which they have never, under normal trading conditions, quite recovered.

To meet the situation all sorts of remedies have been advocated and attempted—set the railways free—nationalise them—sell and rent the permanent way. In 1928, the railways commenced heavy investments in road passenger transport undertakings, hoping, no doubt, to make on the swings what was being lost on the roundabouts, but this neither stopped nor excused the loss on the roundabouts. To ration the freight market was less easily attempted and "protection" was eventually sought under the Rail-Road Traffic Act.

It is a time-honoured view that the low value which the assets, represented in the enormous railway capital, could command in other uses, has ensured that some of the earnings would be ploughed back to maintain these assets in a revenue-earning condition. It was obviously preferable to earn something, however small, than nothing, but so far from attracting fresh capital, the cry has been to cut it down. But it is not sufficient merely to maintain the *status quo* or, even worse, slowly to stagnate.

Nor has this unhealthy condition been without effect on the staff. To be constantly reminded of it by the word economy, in the long run destroys real efficiency, particularly while there is every apparent indication of the contrary. The step from impatience to apathy is short. The wage bill, representing some 60 per cent. of the total expenditure, inevitably becomes the whipping boy. True, it reaches this dimension; therein—and one way or another it has to be faced—lies the way to real economy.

If the quantity of staff is adjusted, so too must adjustments be made to the other factors of production; it is not sufficient to withdraw a "unit" and leave the work to be done by the remainder—at overtime rates. There is a great deal of talk of staff reduction, but it fails to be impressive when advertisements daily adjure us to join the railway service as engine and carriage cleaners.

I admit that the development of the internal combustion engine has rendered some railway services redundant and to continue their operation would be reckless dissipation, but the present volume of railway traffic is far below their ultimate technical capacity. Unless the crutches are thrown away and occupational therapy substituted, it may prove to be beyond the limit of their economic capacity.

Yours faithfully,

GEO. F. THOMLINSON

56, Stockens Green, Knebworth

[The foregoing are the main points in a long letter from our correspondent which for reasons of space we were obliged to curtail.—ED., *R.G.*]

Limitation of Railway Speeds

February 17

SIR,—If, as the figures quoted by Mr. Jacobsohn in his letter of January 12 suggest, the mechanical limit of rail travel is to be no higher than 150 m.p.h. then I admit to considerable trepidation. Transport is the elimination of distance and if the railway is to continue an economic existence it must provide a quality of service peculiar to itself at a price which will attract much of the traffic now carried by its competitors.

In the production of its service the railway enjoys an important, and expensive, advantage—a private track on which it can perform without inhibition save by the block telegraph regulations. Obviously it is necessary to distinguish between the mechanical speed limit and the practical limit, for many non-mechanical factors influence the speed at which trains can operate. Nevertheless it is remarkable that in 1935 an engine, old at that time, succeeded in maintaining an average speed of 80 m.p.h. for 300 miles with a six-coach train. Later experiments disclosed the ability of similar engines to sustain under load a speed of over 100 m.p.h. for considerable distances. It is here that the conclusions to be drawn from Mr. Jacobsohn's data are not as they may appear at first sight. Did *Papyrus* on that memorable day suddenly develop double its normal "power"? No, I suggest that such performances demonstrate the appalling waste of an engine's potential when it is not pressed to the limits of its mechanical capabilities.

Whether or not the isolated examples of the so-called super-fast trains operated before the war were, in their own right, commercial successes does not under present conditions form a proper basis on which to anchor speed policy. It is no longer just a question of providing one or two luxury trains with their localised publicity values, but the speeds and the real sales value of all trains, not excluding freight, which must be improved, and the great advantage—the private way—fully exploited.

At one end of the distance range lies the extremely mobile road vehicle, at the other the aeroplane. Neither is content with its present sphere of influence and both cast predatory eyes towards that portion of the market in which the railway could reign supreme. Technical evidence cannot be ignored, but I venture to suggest that there is an almost lethal hypnosis in the phrase "a mile-a-minute."

Yours faithfully,

GEO. F. THOMLINSON

56, Stockens Green, Knebworth

THE SCRAP HEAP

As You Were

An agency message from Buffalo, New York, says that workers in a coal yard built a fire under a truck to thaw out a frozen shipment so they could unload it. The fire ignited the coal; then water put out the fire and refroze the coal.

Planets Travel Bureau

A travel bureau for trips to the planets has been started by a New York business man, and more than 200 people have booked seats. Four space ships will leave every day, except on Sundays and holidays, from a New York space port in Central Park, starting in March, 1975. Prices will be announced "later."—*From the "News Chronicle."*

Railway for Sale

The Norwegian State Railways are offering for sale a complete 3 ft. 6 in. gauge railway, including 16 engines, 400 wagons, and some 60 coaches. It is the former Vestfold Railway, of which the conversion to standard gauge was described in an article in our January 13 issue.

Various offers have been received for some of the coaches, to be converted as bathing huts and summer houses, but the State Railways favour an offer from Siam, reported to be the only prospective buyer prepared to take the lot and use it for its rightful purpose.

"Oh Mr. Porter"

Two special trains were recently provided free by British Railways for seven people who missed their return day excursion trains because a porter misled them.

After spending all Sunday in Nottingham the day trippers were travelling to Derby for a connecting train to Huddersfield and Hebden Bridge, Yorkshire, when a porter at Trent Junction told them to change. Later, an official apologised and said: "We have made a mistake, but we'll get you home."

The party returned to Nottingham and reached Leeds through Sheffield early the next morning when local services had stopped. Two trains, one with four carriages and the other with three, were then chartered to take four people to Hebden Bridge and the rest to Huddersfield.—*From the "Daily Mail."*

Windfall

An Irishman in Dublin chose the eve of St. Patrick's Day to get a weight off his mind. This was the memory of the hours he took off duty for divine worship on Sundays five years ago, during his working hours as a railway porter. As a result of his pangs of conscience, the deficit on British Railways will be reduced by 64s. 6d.

Recently a letter written in ink and unsigned and postmarked in Dublin, arrived at Euston. It had been sent on from the London Midland Region district goods office at Birmingham, to which it was addressed.

The letter said: "Sir, I was employed by your firm as porter for nine months during 1945 and I wish to make restitution for time taken off by me to attend Divine Service on 26 Sundays and failing to clock on for such. I consider I owe £3 4s. 6d., and I am sending the amount of £2, with balance later."

The writer requested acknowledgment of receipt by advertisement in an Irish newspaper and this is being seen to by the railway authorities.—*From "The Irish Times."*

Britannia Tubular Bridge Centenary

A hundred years ago, on March 18, 1850, the first stage of one of the boldest railway engineering projects was completed by the official opening of the first of the two tubes of the Britannia Tubular Bridge over the Menai Strait.

The opening established the first through railway link between Euston and Holyhead for the passage of the "Irish Mail," the oldest named train in the world. Robert Stephenson, the engineer who built the Chester & Holyhead Railway, succeeded in bridging a strait 1,500 ft. wide, 100 ft. high, and with a tidal rise and fall of 20-25 ft.

Before the bridge was opened, the "Irish Mail" had to disembark men and mails at Bangor, whence they were conveyed by horse carriage to Llanfair on the other side of the Menai Straits to resume the journey to Holyhead in another train. The second tube of the bridge was opened for traffic on October 19, 1850.

Tradition

One of the main criticisms which I make of the railway service under nationalisation is that there were too many changes made merely for the sake of making changes. . . . These unnecessary changes had a disturbing effect on the staff. They rather spoiled the corporate unity and it must be remembered so far as the Great Western Railway was concerned that it was a family railway. A large proportion of the staff are the sons and grandsons of Great Western men who have been brought up with the railway. They did not like changes which seemed to them unnecessary and which spoiled the spirit of the railway which had continued for so long.

The crowning folly of all was that promotion ceased to be by region. I know from my own experience that many men in the railway service have often remained in it in the past, although drawing lower salaries than they could have earned elsewhere, solely for sentimental reasons. To start altering all the names, giving new names to old jobs, new colours, and so on, destroyed prestige, and the value of that connection was gone.

In the past, the War Office has often been criticised for too much red tape, but even then, they never contemplated abolishing the Grenadier Guards because they ceased to be armed with grenades. Yet that sort of thing was constantly going on in the nationalised railway service. There seemed to be no appreciation of the value of tradition and too much attention was being given to paper work and altering things for the sake of altering them. . . .

I urge that we pay far more attention to tradition in the railway service, and that we should seek to close the gap—and I do not mean the dollar gap—which unfortunately exists between the British Transport Commission and the Railway Executive, and the even greater gap which exists between the Railway Executive and the various Regions.

I think that the efficiency of the lines would be greatly improved if a great deal more authority were given to the man on the spot. In the railway service, there is at all grades great responsibility resting on the man on the spot, and that must always be so. That extends down to grades which are not high in the service, to the signalman in his lonely box on a branch line, and the ganger walking his length. . . .—*Mr. Geoffrey Wilson (Truro—Con.), formerly an Assistant Solicitor with the Great Western Railway, in the debate on Transport in the House of Commons on March 15.*

"Fooled yer!"

[Reproduced by permission of the proprietors of "Punch"

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NEW SOUTH WALES

Western Line Improvements

To meet increasingly heavy traffic on the Western line out of Sydney, quadrupling is now in hand on two sections, Lidcombe-Granville and Seven Hills-Blacktown. To avoid crossing main-line tracks on the level a flying junction is also being constructed at Blacktown for the Richmond branch traffic. The quadrupling of the main line is also to be undertaken onwards to Doonside, the station beyond Blacktown, and the increasing coal traffic is to be catered for by the provision of up and down refuge loops at other suitable spots. Signalling is to be brought up to date. These additional works are expected to be begun at once.

On the Blue Mountains section refuge loops are proposed between Valley Heights and Katoomba, but because of the gradients and topographical difficulties, sites for them must be selected carefully. The distances west of Sydney are: Valley Heights 48 and Katoomba 68 miles. Their altitudes are 1,056 and 3,336 ft. respectively.

New Bridges on Newcastle Line

On the Strathfield-Hornsby section of the "Short North" line, the existing Parramatta River Bridge carries double-line traffic, but is not strong enough for 4-8-2-type locomotives. It is therefore being replaced by a new four-line structure. The northern or Meadowbank abutment is now nearly complete, and work is in hand on the twin-cylinder piers some of which will be sunk 100 ft. below high water level.

Six other bridges between Hornsby and Newcastle are being or will be replaced by new structures alongside the existing ones. That at Wallarah Creek has been completed, and that at Cockle Creek—two through truss spans each of 147 ft. 6 in. on R.C. piers—is nearing completion. A new ¼-mile approach to the latter was necessary from the south. With one exception, speeds permissible over this line will be 70 m.p.h., and the heaviest engines will be able to use it throughout once the new bridges are in service.

CANADA

Duplex Roomette Cars

The first duplex roomette car to be built in Canada to provide sleeping car rooms at a little more than the cost of a lower berth has been inspected by Mr. Donald Gordon, President, Canadian National Railways, and Mr. Victor M. Drury, President, Canadian Car & Foundry Co. Ltd. Twenty of these cars have been ordered by the C.N.R. Each car has 24 individual self-contained rooms, half of which are at floor level, and the others two steps above the car floor.

In the upper room, a full-width bed pulls from a recess in the wall, and in the lower room it slides out from under the seat. Mattresses and sofa-type seats are of foam rubber. The rooms can be enclosed for complete privacy by sliding doors. There is comfortable seating accommodation in each roomette. Heating, air-conditioning, lighting and ventilation controls, fold-away wash basin, medicine cabinet, and concealed toilet are provided in each room. There is a section table for playing games or serving meals.

UNITED STATES

Dieselisation on Burlington

With the recent addition of seven 2,250-h.p. diesel-electric locomotives, the Chicago, Burlington & Quincy Railroad is operating 93·4 per cent. of its regular passenger trains by diesels.

Dome-Cars on the Wabash

The Wabash Railroad has placed in service between St. Louis and Chicago a new streamline "Blue Bird" train with four of its six coaches Vista-Dome cars. Total seating, including the dome sections, is for 382 passengers. The schedule is 15 min. less than that of the previous "Blue Bird"; the northbound train leaves St. Louis at 8.55 a.m. and arrives at Chicago at 2.5 p.m.

Budd Railcar Test

On February 23, the Chicago & Eastern Illinois Railroad began a two-weeks test operation of the Budd Company's diesel railcar, RDC-1. From Chicago to Watseka, the car ran dead behind the "Meadowlark," a diesel-hauled streamline train leaving Chicago at 5.10 p.m. for Cypress. At Watseka, the railcar was detached, and ran by its own power to Evansville.

The President of the railway stated that his company wanted "to find out if this form of transportation performs a public service and is acceptable to the public" and if the Budd car would bring back some of the business lost to other forms of transport and it was economical to operate a diesel-propelled single car.

ARGENTINA

Rationalisation in Rosario

The terminus of the former Compañía General (C.G.B.A.) railway in Rosario and also La Bajada Station have now been closed as a further step in the rationalisation plan for the railways of the city. Passenger trains will be dealt with at the former Córdoba Station and goods traffic at Sorrento (former Santa Fé) Station.

Ticket Ruling

A new ruling of the Ministry of Transport establishes that in future each passenger must carry his own ticket, thus doing away with the present practice of one person carrying all the tickets belonging to a group of passengers travelling in different parts of crowded trains, which makes proper control by the guard difficult.

Reductions in Cattle Rates

In view of the intense drought of the last five months, and the consequent deterioration of pasture land for cattle, the Government has decided to grant a 30 per cent. reduction in freight charges for cattle transferred from districts affected by the drought.

MOROCCO

Casablanca Maritime Station

The new Sidi Belyout Station now under construction at the entrance to the port zone at Casablanca is expected to be finished by the end of 1950. It is intended to handle a limited service for passengers and freight from Casablanca to Rabat and Port Lyautey, and also trains for tourists travelling to Marrakech, Rabat, Meknes, and Fes. Regular long-distance line trains, particularly those from Casablanca to Oudja and Algeria, will continue to use the main Casablanca Station.

The limited area on which the new station is being constructed makes it impracticable as a general station for Casablanca. A plan for a central station is not to be carried out yet because of the cost.

IRELAND

Rugby International Traffic

Comprehensive arrangements were made by the G.N.R.(I.) to handle the traffic in connection with the Wales v. Ireland Rugby match at Belfast on March 11. In addition to two all-restaurant special trains leaving Dublin at 10.45 and 11.10 a.m., the ordinary 9 a.m. express there were six special trains from Dublin, one from Cork, and one from Enniskillen.

In all, over 6,000 passengers were dealt with, and many of them were served with meals during the journeys to and from Dublin. There was little interference with ordinary services.

BULGARIA

Increased Fares and Rates

Passenger fares and goods rates are to be increased by 50 per cent. as from April 1. Only fares for passengers regularly travelling between home and place of work are to be left unchanged.

GERMANY

Cinema in Bremen Main Station

Bremen main station is to have a cinema, with accommodation for 450 visitors, situated in the former third class waiting room of the station. Performances will be continuous night and day. The programmes will consist mainly of short entertainment, cultural, and advertising films.

Future Possibilities of Electric Traction

Sir Cyril Hurcomb reviews the progress of electric traction in Great Britain and looks to the future

IN his address at the opening session of the Electric Traction Convention in London on March 20, Sir Cyril Hurcomb, Chairman of the British Transport Commission, said that, although there was already a considerable mileage of electrified lines in this country, there was no uniformity in the technical methods or standards inherited from the past. That was true, even leaving apart the system of underground railways in London, which, as Mr. T. S. Pick pointed out in his paper, consisted of an amalgamation of several separate electrifications carried out without relation to one another or any thought that one day they might form part of a unified concern. They were committed to third rail in South-East England, and in the rest of the country the haphazard electrification of so many different types had retarded progress.

Standardisation of Electrification

Much too late in the day the Railway (Standardisation of Electrification) Order was made in 1932 as a result of the Pringle Report on Standardisation of the systems. After a lapse of 18 years, and in the light of so much development abroad, they thought it would be well if a group of railway officers reviewed the recommendations of the Pringle Committee and other technical matters concerning electrification, including standards. They had gone into the matter exhaustively, and, though he had not yet seen the report, he would be surprised if it did not confirm the main conclusions of their predecessors as to the standard voltage appropriate for the overhead systems. In this investigation they had been fortunate to have the advice and help of Mr. Frank Lydall, who had rendered great service to electric traction.

They might safely assume that no technical difficulties need hamper an extensive programme of suburban and main-line electrification, provided they thought it wise to proceed on economic grounds, and that other than in South-East England they would adopt a 1,500-V. overhead system. He was advised that no serious difficulties need arise in inter-running between the overhead and the conductor rail systems and that electric vehicles could be fitted for equipment suitable for either.

The vast system of British Railways had been built up on the qualities of the steam locomotive which still remained the solid foundation of rail transport in this country and on the majority of railways throughout the world. The only serious competitor at present—except in the U.S.A. where for all long hauls dieselisation was fast superseding steam—was electric traction. Main-line diesel and gas turbine locomotives were now on trial in Great Britain and had yet to be proved. It was right that they should gain experience of these developments, and perhaps others too, under the actual operating conditions of this country, and that their advantages and disadvantages should be carefully assessed under the supervision of officers of British Railways.

They had reached a point, however, where they must make some general assessment of the future of motive power, and early in 1948 the B.T.C. invited the Railway Executive to give urgent attention to the whole problem of motive power. Officers were then appointed to report on the estimated future balance of advantage as between the various forms.

The determination of that balance was, perhaps, the most serious railway question they had to decide in its technical and in its financial and economic aspects. They were now awaiting the report, but, meanwhile, the problem was examined by Sir Eustace Missenden in a paper read to the Institute of Transport in November, 1949, and it was significant that, after balancing the probabilities, such an experienced railway operator should come down on the side of electrification.

Economic Aspects

Mr. C. M. Cock, author of the first paper, would point out that railways were electrified for a variety of reasons, largely economic, and it might be argued that conditions in this country were not unfavourable for extensive electrification at the time of the Weir Report, with the reason for its slow growth, apart from the striking exception of the Southern Railway with its preponderance of passenger traffic, somewhat obscure.

Was it perhaps now the fact that the steam locomotive had reached the peak of its efficiency apart from the improvement in details tending towards better availability? Also, was it not certain that the efficiency and reliability of electric traction were still improving, and that there was a wide field in this country where electric traction would, given favourable traffic, reduce the annual working expenses and provide much improved services under main-line and suburban conditions.

Nobody should be unduly critical of the old boards of railway directors who hesitated to take the plunge into wholesale main-line electrification, for there was much to make them pause, and today we were faced with many of the considerations which confronted them. In suburban areas one could fairly assume a considerable additional passenger traffic from electrified services. Some of this additional traffic would be created by the new facilities themselves and by the cleaner and brighter stations which would accompany them. Part of the traffic would be gained from the road, including the private motorcar, but some would be a diversion from their own road services. He would not be disposed to underestimate the possibilities of additional traffic on long-distance services fostered by speedier and more frequent services and a radical overhaul of the timetables.

Before they considered embarking hundreds of millions in an investment doomed to remain unremunerative if the traffic was not secure, they would want to feel reasonably certain on some major questions. A forward programme could be greatly assisted if they could look to the manufacturers of equipment, not only for the high standards of performance which they now offered, but also to keep the costs as low as possible. They would have to look to their own staff not to make the cost of manning electric locomotives prohibitive and they would need to be guaranteed cheap electricity.

Finally, and most important point of all, they would need to know that the transport system as a whole would be sufficiently rationalised and integrated to give a reasonable chance of securing the traffic which they set out to gain and for which they would be making a heavy new expenditure in fixed capital, without finding it diverted from the public transport system.

Sir Cyril Hurcomb expressed his personal view that the electrification of South East England so admirably begun by the former Southern Railway must be completed so that freight traffic and not merely passenger traffic could be electrically hauled. In the report on the London Plan they had indicated the necessity for additional tubes in the London area and they also regarded the electrification of the Tilbury & Southend line as even more urgent.

Suggested Extensions

They might extend the recently electrified line from Liverpool Street to Shenfield and the Manchester-Sheffield line now being electrified might be projected to Liverpool. In the area round Manchester there were opportunities for linking up and extending the existing bits and pieces of electrified lines and the same was true of Liverpool. Gradually they might electrify Lancashire from such beginnings and something existed on Tyneside. They were also looking into the position at Glasgow.

What all of them would most like to see would be a main-line electrification scheme from London right the way through to the point at which density of traffic began to tail off. There was still no main-line electrification in this country in the full sense, although British manufacturers had undertaken successfully large schemes of main-line electrification overseas.

Railway Electrification in Great Britain

Some notes on the economic aspects of electrification and a consideration of several recent developments

MR. C. M. COCK, Chief Electrical Engineer, Railway Executive, in his paper to the Electric Traction Convention on March 20, dealt first with the economic aspect, pointing out that, while in some countries electrification was dictated by shortage of fuel, others justified its use mainly on economic grounds, *i.e.*, the total operating costs with electric traction were lower than the operating costs with steam traction for the same kind and amount of traffic. The yardstick for economic justification was the traffic density—the number of trailing ton-miles per mile of single track per annum—and comparing this country with others it was astonishing that so little main-line electrification had been carried out in Great Britain.

Advantages of Electrification

Apart from the economics of the case, possibly it had never been fully realised here that other advantages could be obtained, such as conservation of fuel, higher schedule speeds, smoke abatement, and cleanliness, the latter being a subsidiary but still an important factor. Although for some time the cost of equipment had been rising and tending to weight the case against electrification, this should be offset because, with less manpower and less fuel being required for electric as compared with steam traction, the annual operating expenses of electric traction did not increase in the same ratio as those for steam, so that, broadly speaking, the conditions for general electrification should not be very different today than they were at the time of the Weir Report in 1931.

A large proportion of the cost of electrification went in overhead equipment and considerable pruning was necessary to effect economies in construction without reducing the reliability of the equipment. Much could be done in attention to details, which, although saving only a little in themselves, could enable large savings to be made in the aggregate in the cost per mile. There would seem to be room for reduction in the cost of structures and foundations and also in many of the line fittings. Savings could also be effected in reducing the weight and number of insulators. The most costly item, however, was labour for erection, and this cost must be reduced.

In the Weir Report it was stated that electrification of the railways of this country could be justified with a traffic density over 2·3 million trailing ton-miles per mile of single track per annum. At best, such figures could only be approximate and hypothetical, though a recent check indicated that the figure was somewhere between 3 and 4 million, and if this might be accepted as a fair assessment, some 50 per cent. of the running lines in this country could be electrified economically. This would permit the use of indigenous fuel, and, moreover, would leave large quantities which could be more profitably exported. Lower-grade coal would be used at the power stations and the load factor on the National Grid would be improved.

Apart from justification of electrification on savings in operating expenses against like-for-like steam conditions, increased traffic would bring increased revenue when suburban services were electrified, and this had been proved time and again. The latest example was the Liverpool Street-Shenfield line on which electric services were started towards the end of last year. In a little over four montths, the passenger journeys on this line increased by 66 per cent., proving that there was still a field for increased earnings.

Important Improvements

Perhaps the most important recent improvement was the perfection of the mercury arc rectifier, which for d.c. systems had replaced the rotary convertor for the lower voltages, and motor generators for the higher voltages. The rectifier had removed one of the disadvantages of the 3,000-V. d.c. system which previously required substations equipped with motor generators. Not only had the rectifier effected a marked reduction in first cost, but it had raised the conversion efficiency at 3,000 V. from about 85 per cent. to 95 per cent. It had also reduced the cost of maintenance.

One of the disadvantages of the high-voltage a.c. system was the comparatively high cost of maintenance of the single-phase commutator motor used for traction. The perfection of the mercury arc rectifier made it possible to use d.c. motors for high voltage a.c. traction systems by converting in a simple way a.c. to d.c. on the locomotive or motor coach. Experiments in Germany and in the U.S.A. indicated the practicability of this arrangement both for locomotives and motor coaches, but the harmonics produced in the overhead line caused interference to telecommunication circuits, and this difficulty had not yet been entirely overcome.

Another important development was the use of high-voltage single-phase 50-cycles energy in the contact line. This system, although in the experimental stage, was attractive in that it reduced to a minimum the cost of the fixed installation. Power was taken direct from the grid with traction substations in their most simple form, *i.e.*, a step-down transformer instead of expensive and inefficient rotating machinery for frequency changing. Here this development might make possible the electrification of branch lines. A section of the Hollentalbahn was equipped with 50 cycles 20,000-V. single-phase contact line in 1936 by the Deutsche Reichbahn and was still working successfully. One difficulty was in the production of a suitable 50-cycles commutator motor. In the meantime the design of such motors had improved. Although the Germans had no intention yet of extending their electrification on this system the French National Railways intended to carry out a similar experiment with up-to-date and improved 50-cycles locomotives on an experimental line 55 miles in length from Aix le Bains to La Roche sur Foron. Three prototype locomotives were being built. The suitability of the 50 cycles commutator motor had yet to be proved.

Remote control of unattended substations had brought considerable economies in operating expenses. Control rooms could be built to cover 15 to 30 substations, say 150 to 300 switches, and this apparatus, employing as far as possible standard Post Office equipment, had proved reliable and efficient in service.

The Multiple-Unit Train

The multiple-unit train was now a thoroughly reliable means of transportation and this had been brought about by continual and progressive improvements in the design of the traction motors and control gear. As an instance of their consistent reliability the Southern Region recently reported a four-week period of 0·48 failures per 100,000 car-miles or roughly one mechanical or electrical failure per coach every two years. This was very good in view of the fact that the Southern run approximately 5,000 electric trains daily.

A good deal of research was necessary to determine precisely the effect of the axle-hung motor on the track. It was known that with electric traction the increased traffic and the multiplicity of driving axles increased general wear and tear on the track, but until proper research was brought into this problem, it was difficult to get at the root trouble that was detrimental to the track.

The capital cost of electrification was high and at the present time capital investment was regarded with the greatest distaste as all resources must be concentrated on export. But a powerful and inevitable factor was that our technical and commercial ability should be actively assisted and maintained by the electrification of railways in this country so as to ensure successful competition in work overseas.

Electrification of the Liverpool Street-Shenfield Lines

Technical features of the largest 1,500-V. d.c. overhead conversion yet carried out in Great Britain

ELECTRIFICATION from Liverpool Street to Shenfield, the major post-war event in this category so far accomplished in Great Britain, was the subject of a paper presented to the second session of the convention by Mr. H. H. Swift, Acting Electrical Engineer, Eastern & North Eastern Regions. Work on the scheme began in 1937, but ceased in 1940 and was not resumed until late in 1946. By this time it was decided to electrify all four tracks throughout to Shenfield, whereas the original proposal had been to equip only the local lines east of Gidea Park. A partial electric service was inaugurated after the opening ceremony on September 26, 1949, and on November 7 in the same year the whole of the suburban services to Shenfield were changed over to electric operation with a peak service of 18 trains per hour into and out of Liverpool Street. This frequency was being increased to 21 trains per hour.

The original scheme (later increased by conversion of the through lines from Gidea Park to Shenfield) involved the electrification of approximately 86 single-track miles of running lines and 14 miles of sidings, with overhead-line equipment at 1,500 V. d.c.

This method of current collection was adopted for various reasons, among the most important of which was the desirability of leaving the running tracks entirely free of any obstruction such as was inevitable with third-rail collection, so as to give the permanent-way gangs every opportunity to maintain this important section of line in first-class condition. Further, as it was anticipated that at some future date the electrification would be extended to Southend and possibly to Colchester, the use of 1,500 V. was obviously desirable as it increased the substation spacings, obviated difficulties at level crossings, and made possible a better design of electric locomotive should these be required for freight or main-line passenger working at a later date.

Power Supplies

The electrical energy for traction was obtained from the British Electricity Authority and is supplied at Crosswall substation from an existing B.E.A. (London Division) 22-kV system and at Chadwell Heath substation by two Eastern Electricity Board 33-kV feeders laid direct from Barking power station with two additional feeders "T-connected" to two existing Barking feeders for use in emergency.

At Crosswall substation there were two 22/33-kV transformers, thus enabling the equipment and cables for all substations on the system to be standardised at 33 kV. The two supply points were connected to the remaining five substations by 33-kV. three-core cables laid alongside the track and generally supported on hangers attached to concrete posts except where physical conditions dictate the use of hangers fixed direct to walls, or the use of concrete troughing laid at cess level.

There were in all six traction substations and four track-sectioning cabins on the system, and the total capacity of the converting plant installed was 30,000 kW, compromising 15 rectifier units each rated at 2,000 kW. None of the substations or track-sectioning cabins was manned, but the main items of equipment were controlled from Chadwell Heath electric control station.

The rectifiers were of the pumpless steel-cylinder air-cooled type, each unit comprising two 6-anode cylinders connected for 12-phase working. The cooling fan for each cylinder drew air through ducts, with adjustable louvres so arranged that the cooling air could be drawn either from inside the substation, directly from outside through air filters, or a combination of both. By suitable adjustment of the louvres the inlet air temperature could be controlled as required.

Extractor Fans

After passing over the rectifier cylinders, the air was discharged into the building and extracted therefrom by fans. One fan per rectifier equipment was provided, located at the far end of the building, each being arranged for automatic operation in conjunction with its associated rectifier. The fans could be cut out or hand-switched if desired.

This system of ventilation was not only extremely flexible, but also resulted in the heat losses from the rectifiers being used, as required, for the general heating of the buildings.

The d.c. negative system was normally unearthed. Under certain fault conditions it was possible for the negative system to be impressed to a voltage which might be dangerous to personnel. To protect against this, a negative-earthing device was installed at each substation, and so arranged that when the d.c. negative system rose to 150 V. it was connected immediately to earth. A neon tube initiated this connection and was then short-circuited by a contactor. Operation of the contactor was indicated back to the control station, when the fault condition had been cleared the contactor could be restored to its normally open position by remote control.

The substations and track-sectioning cabins were operated from Chadwell Heath control station by supervisory control apparatus of the telephone type using for each control operation and indication, a 50-V. constant-total impulse system.

All control operations were effected from either of two master panels which, together with their associated transmitting and receiving apparatus, could be connected at will to any substation or track-sectioning cabin. Two sets of control operations could be carried out simultaneously, provided that the selected substations or track-sectioning cabins were on different control circuits.

As each master panel could not deal simultaneously with more than one substation or track-sectioning cabin, provision was made in the apparatus for the storage of calls from an unconnected substation until the master panel was free to accept them on selection by the control operator.

Overhead Line Equipment

The overhead equipment of all running tracks and junctions was on the compound catenary system, comprising one stranded copper main catenary, one stranded-copper auxiliary catenary and one cadmium-copper contact wire per track. The cross-sectional area was equivalent to 0·75 in.² of copper.

The auxiliary catenary was suspended from the main catenary by six droppers in a normal span of 210 ft., the two centre droppers being in the form of parallel clamps, while the four longer droppers were of solid semi-hard-drawn copper wire. The contact wire was suspended from the auxiliary catenary by loop droppers of uniform length made of copper strip, there being two such droppers between those supporting the auxiliary catenary. The catenary was suspended below the structures on bracket type insulators providing double insulation to earth.

The line equipment was registered in the lateral position at the structures by register arms attached to similar bracket-type insulators, which in their turn were attached to the structure mast or to vertical brackets fixed to the bridge member. Simple catenary equipment was used in sidings, consisting of one cadmium-copper stranded catenary and one cadmium-copper contact wire.

The steel structures carrying the overhead line equipment were normally of the portal-bridge type and spanned all electrified tracks. For structures spanning more than four tracks, and for anchor structures, built-up lattice construction was used. Many structures in the first ten miles out of Liverpool Street were of special design to carry colour-light signals as well as the overhead line.

Motive Power Equipment

The rolling stock consisted of 92 units, each composed of a motor-coach, trailer coach and driving trailer coach, the three vehicles being semi-permanently coupled together. Units might be coupled together to form trains of up to nine coaches, which was the normal composition, although some six-coach

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British Underground Railway Practice

Power supply and distribution to the 186·25 route miles of the London Transport railway system

IN the introduction to their paper presented to the second session of the convention, Mr. T. S. Pick, Electrical Engineer, London Transport Executive, and Mr. R. Dell, Signal Engineer, London Transport Executive, discussed the special conditions prevailing in underground railway practice. The highest possible degree of reliability was necessary in order to ensure continuity of service, and a liberal provision of standby equipment and of alternative sources of power was essential.

The London Transport railway system had a route-length of 186·25 miles, comprising 519 miles of single track, and it handled about 554 million passengers a year. Supply to the trains was at 630 V. d.c., with insulated positive and negative conductor rails. The density of traffic during morning and evening rush hours reached 40 trains an hour on each track, and in these conditions a delay of only 1½ min. was equivalent to cancellation of a train. Such an interval was accompanied by dense crowding on the confined platform space, and, if the influx of passengers were not promptly controlled, the presence of new arrivals might well force passengers off the edge of the platform on to the electrified line.

Power Supply and Distribution

The power supply was derived mainly from three generating stations, which were owned and operated by the Executive. They were:—

(*a*) The Lots Road station at Chelsea. This station now had a capacity of 168,750 kW., and generated 3-phase power at 11 kV. and 33⅓ c/s.

(*b*) Neasden generating station, which had a capacity of 87,000 kW., the supply being 3-phase at 11kV. and 33⅓ c/s.

(*c*) Greenwich generating station. The re-equipment of this station was in hand at the outbreak of war, but the work was interrupted and the station was still in a transitional state. The plant in the reconstructed section now supplied part of the railway load, had a capacity of 60,000 kW., and generated at 11 kV. and 50 c/s. (A further 20,000-kW. turbo-generator was in course of erection.)

The normal system of distribution from Lots Road and Neasden consisted of two or more radial feeders connecting between the generating station and each substation; economy had been obtained, however, in some instances by grouping cables together with a switch-house or distribution station, and each substation concerned was then fed by duplicate feeders radiating from it.

In certain outlying open sections, ring mains had been installed instead of radial feeders, mainly for the sake of economy, but these had proved less reliable than the duplicate radial-feeder system and such an arrangement was not now considered desirable for use on underground sections.

The majority of the railway substations fed from Greenwich generating station served the eastern extension of the Central Line from Liverpool Street to Epping, together with the loop line *via* Newbury Park and Hainault. The route length of these sections amounted to 26 miles (of which only 7·5 miles were in tube) and the distance between Greenwich and the most remote substation at Epping was beyond the economic limit for 11-kV. transmission. This factor had necessitated the adoption of 22-kV. distribution for all substations serving this extension, and since Greenwich was the only one of the Executive's generating stations which produced a 50-c/s supply, an alternative source had been provided by means of an interconnection with the British Electricity Authority supply, which fed into a distribution station at Aldgate.

For any future reconstruction it was proposed to generate at 22 kV. and transmit all bulk supplies at this voltage with step-down transformers feeding the busbars of the distribution stations at 11 kV.

Each distribution station would form the control station for the remote control of all substations fed therefrom, and the operator would thus have complete control of all circuits emanating from the bulk supply under his charge. Arrangements would be provided also whereby these distribution stations could be fed in emergency from an alternative source.

Substation Equipment

There were 86 substations at present feeding the Executive's railway system and a further six were awaiting completion as part of the North London and North-East London Extensions. Of these 92 substations, 67 were connected to the Executive's own generating stations, the remainder being energised by the British Electricity Authority.

At the end of 1948 the capacity of the plant in operation in the railway section of the Executive's undertaking was made up as follows:—

	kW.
Rotary convertors	197,700
Rectifiers, water-cooled, pumped ...	117,500
Rectifiers, air-cooled, pumpless ...	42,500
Rectifiers, glass	2,000
	359,700

Most of the older substations equipped with rotary convertors were provided with transformers of the air-blast type. With various extensions of the lines into less congested areas, 3-phase oil-cooled transformers were introduced, with a view to obviating the necessity for the fan, and for air filters, which required frequent cleaning. These transformers had been located outside the buildings, and in some cases oil-sumps had been provided, but nevertheless fire risks had shown themselves to be very present, and the replacement of a transformer was both a lengthy and a costly procedure.

As a result, air-cooled transformers were being reintroduced but would now be equipped with a totally-enclosed air-blast together with an appropriate type of cooler. In the smaller sizes this cooler might consist merely of cooling tubes or radiators attached to the side of the tank, as usually adopted with oil-cooled transformers; and in the larger sizes it might take the form of a nest of tubes equipped with cooling fins, and provided also with an external air blast.

The need for such a design, apart from quick and easy exchange for maintenance purposes, had increased owing to the difficulty of obtaining sites in the congested area of Central London, and these units were suitable for installing in the lift shafts now rendered redundant by the introduction of escalators.

D.C. Circuit-Breakers

When rectifiers were introduced, high-speed circuit-breakers were installed on the positive pole of all d.c. circuits, those on the rectifiers being arranged for reverse-current release in order to interrupt any current which would be fed back into the bulb during a backfire from any other machines operating in parallel. The substations housing this type of plant were all of the unattended type and remote isolation of the negative pole had therefore to be provided for as well. This feature had been obtained by fitting the negative pole of each circuit with an electrically-operated contactor, whose closing and opening circuits were interlocked with the high-speed circuit-breaker on the positive pole.

The duty of d.c. circuit-breakers was extremely onerous, and various arrangements were adopted to permit maintenance even during traffic hours. At some substations each circuit-breaker was mounted on a withdrawable carriage provided with plug-in connections, one to the busbar and one to the feeder. Besides permitting the removal of the entire circuit-breaker, this arrangement also obviated the necessity for isolating switches and reduced the size of the switchboard to a minimum.

With the advent of rectifiers, all new substations had been arranged for

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Multiple-Unit Trains

Operating possibilities of division to suit traffic needs or provide through service on branches

MR. W. S. GRAFF-BAKER, Chief Mechanical Engineer (Railways), London Transport Executive, dealt with multiple-unit trains in a paper at Session 3 of the convention under the general heading of "Project Considerations." It was considered, he said, that a service of 12 trains an hour per pair of terminal tracks was the practical maximum with locomotive working, and at that density of traffic or earlier the use of multiple-unit trains rather than locomotive-hauled trains would become essential. The multiple-unit train could be split into portions to meet service requirements and, as long as any portion had a driving cab at each end, such portion might be operated as an integral train in either direction.

Even if a train was not to be divided, the distribution of motive power over a number of axles enabled higher acceleration to be achieved than with a locomotive, with consequent improvement in schedule speeds.

A multiple-unit train might be built up of all motored cars, or of one or more motored cars and any appropriate number of trailers. The distribution of motive power through the train had varied very much. In the older practice, the minimum number of motor-cars with four motored axles had been combined with such number of non-motored trailers as would permit the desired schedules to be operated. This practice tended to produce ill-riding motor-cars owing to the mass of the motors which, by definition, tended to be of maximum size. The mass of the motors was largely unsprung in normal construction and tended to produce excessive lateral oscillation.

This type of motor arrangement might, however, be obligatory with high-voltage systems in order that two motors might be connected permanently in series to keep down the voltage across each motor to a practicable figure, while retaining at the same time at least two economical running speeds.

Motor Bogie Arrangements

Where two motors only were used on one car, as was more usual in recent times, with low or medium voltage (600-1,500 V.), they might be disposed either two on one bogie (with a risk of ill-riding) or one on each bogie.

The former practice was more usual but the latter had been standardised for new cars by London Transport, where advantage was taken of the fact that there was only one motor in each bogie to offset the bogie centre towards the motored axle in order to secure increased adhesion weight on the motored wheels. In addition, the vacant bay of the bogie was used to fit diagonal stays in order to impart a lateral stiffness to the bogie frame.

The modern tendency was to spread the motive power more widely than formerly by the use of smaller motors in larger numbers. This reflected itself in higher acceleration rates, reduced loads on draw and buffing gear, less unsprung weight per axle and smaller mass per bogie.

Control Positions

When the proportion of motored cars was increased, it might well be found that the fitting of driving equipment on each such car would go beyond the needs of operation in respect of train formations for splitting of trains or stabling of portions. In such cases, motor cars had been developed without driving cabs or equipments and functioned operationally as trailers but in equipment as motor-cars. For frequently-stopping services with short sections between stations, the higher acceleration so obtained was reflected in lower overall energy consumption and higher line capacity.

On systems with conductor rails it had been the usual practice to connect together the shoes on the motor-cars by means of power buslines or cables, to ensure a supply to the motors in spite of gaps in the rail. With the increasing proportion of motor-cars and the use of control systems operated at low voltage, the need for power buslines tended to disappear. In such circumstances one motor-car at least normally was certain to be on the conductor rail, while the control equipment was made independent of the line voltage by means of batteries.

In any case, such buslines were prohibited by regulation for deep-level tube working, and difficulty was seldom experienced from lack of contact with the power supply, even with three motor-cars in a seven-car train.

If trains were to couple and uncouple frequently for traffic reasons, consideration might be given to automatic couplers, which simplified the process of making the mechanical, electrical, and pneumatic connections between cars to a push-button operation that could be performed by the driver; however, they were unable to connect power buslines if these were considered necessary.

The practice of coupling and uncoupling trains to adjust them to the demands of peak or slack traffic had to be considered in relation to the complication of equipment and possibly reduced reliability due to the disturbing of circuits. One point in favour of uncoupling at off-peak hours was that cars withdrawn from traffic were available for maintenance and cleaning purposes in daytime.

No general case could be stated for uncoupling, and each service, traffic and route must be studied before a decision could be reached. For instance, a recent study of the problem of London Transport services indicated that for lines of the tube type the operation of 8- and 7-car trains in the peak traffic and 6- or 7-car trains in the slack period would best meet the requirements. For lines of the surface type, an 8-car formation in the peak period and a 6-car in the slack was indicated.

Mr. Graff-Baker's paper concluded with some appendices reviewing practice on London Transport and various Regions of British Railways with regard to uncoupling to meet traffic variations or special service requirements. The provision of split services for branch lines was carried out to a greater extent on the Southern Region than elsewhere, trains being divided at junction stations and re-formed at the same stations on the return journey. An average period of two min. was allowed for coupling and uncoupling of the divisions.

Electrification of the Liverpool Street—Shenfield Lines

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trains would be run during off-peak periods and on Sundays.

Each motor-coach was provided with four axle-hung, self-ventilated-series traction motors of 210 h.p. (1-hr. rating) at 750 V., the two motors in each bogie being connected permanently in series. Ventilating air was drawn through louvres built into the sides of the motor-coach and led by means of ducts incorporated in the coach construction, and flexible bellows, to the motors. Current was collected from the overhead line by a spring-raised air-operated single-"pan" pantograph on each motor-coach.

The control gear was of the conventional electro-pneumatic unit switch type, the majority of which was housed in three equipment cases slung from the underframe of the motor-coach. This provided one shunting notch under the control of the driver; nine series and five parallel notches controlled from one current limit relay; and one weak-field notch controlled from a second current-limit relay. The notching values were increased in series combination by a shunt coil on the relay increasing the spring tension, and the setting of the relays was adjustable.

Mr. Swift's paper also drew attention to the extensive civil engineering, resignalling, and ancillary works involved in this electrification. These have been reviewed in *The Railway Gazette* of April 15 and September 30, 1949.

Traction Substations

Layout, maintenance, and operation considered, with suggested lines of future development

In a review of traction substation practice over 40 years presented to the fourth session of the convention, Mr. S. B. Warder, Mechanical & Electrical Engineer, Southern Region, pointed to the influence exercised by the hazard of short circuit. This arose from the most conspicuous feature of any electric railway, namely, the exposed system by means of which electric current was delivered to the traction vehicles. Because of the complete change in substation practice that resulted from the introduction of mercury-arc rectifiers into traction service, it was convenient to divide the review into the periods 1915-1930, and 1930 to the present day.

The earlier electric railway schemes depended on supplies of power from d.c. generators, but designers could not keep pace with the increased power requirements, since d.c. output at economical speeds for turbines was limited. These machines therefore were superseded by the a.c. generator and rotary converter, the flexibility of which, by exploiting the use of h.v. transmission between power station and substation, was overwhelmingly in its favour.

The governing feature for converting plant was the ever-present risk of track short-circuits, and the plant that could best withstand their effect was more important to railway engineers and operators than plant that showed a small gain in efficiency. The ability to withstand short circuits was the main characteristic of the rotary machine, while its low capital cost and high efficiency for 25 c/s supply made it attractive.

Introduction of Rectifiers

Later the rotary converter was adapted to 1,500V. systems by connecting two machines in series, and progress was made towards the commercial building of 1,500V., 50 c/s, converters for high powers. A turning point was reached when a mercury-arc rectifier substation as well as one with rotary converters was installed when the Manchester South Junction & Altrincham line was electrified in 1929.

After the Electricity Act of 1935, the railways had to contemplate future electrification on the basis that main power supplies would be taken from the Grid at standard frequency. A great technical advantage resulted from this arrangement, since they could make use of the Grid at strategic points on their systems, and thus alternative supplies could be introduced into a ring main transmission system in a simple and effective manner.

The first rectifiers used in railway traction were all water-cooled, and the reason for their preponderance on the Southern Region was that other suitable alternatives were not available at the time. During the intervening years, however, the water-cooled type had been largely superseded by rectifiers dispensing with water cooling and vacuum pumps, made of glass or steel. Since these were cheaper in capital cost, and easier to instal and maintain, it was likely that water-cooled rectifiers have had their day.

The present total capacities of the different types of rectifier installed in Great Britain for rail traction, including London Transport, were: —

	kW.
Water-cooled, steel tank, pumped	414,500
Air-cooled, steel tank, pumpless ...	47,000
Glass bulb	72,740

One great advantage of the mercury-arc rectifier had been the simplicity with which it could be operated by supervisory control, since, by the remote closing of the rectifier a.c. oil circuit-breaker, the rectifier was almost instantaneously placed in service. It was now the usual practice to equip all rectifier traction substations for supervisory control, and, when the substations were unattended, the necessity for staff amenities on the scale provided for attended substations no longer existed.

There was a total installed capacity of 54,125 kW. of pumpless steel rectifiers on the London Transport system, including those serving trams and trolleybuses.

The Southern Region had in traction service 4,500 kW. of the pumpless type of rectifier, arranged in three 1,500-kW. sets which were installed in 1942. These had worked satisfactorily with the minimum of attention, the only replacement being that of one cylinder out of the total nine, which failure was due to accidental overloading in the early days of its commissioning. As a replacement cylinder was obtained and installed in two days, a useful demonstration of servicing facilities was afforded. In general, it could be said that trouble-free operation had been obtained for seven years, and there was reasonable expectation of this continuing, with consequent negligible maintenance costs.

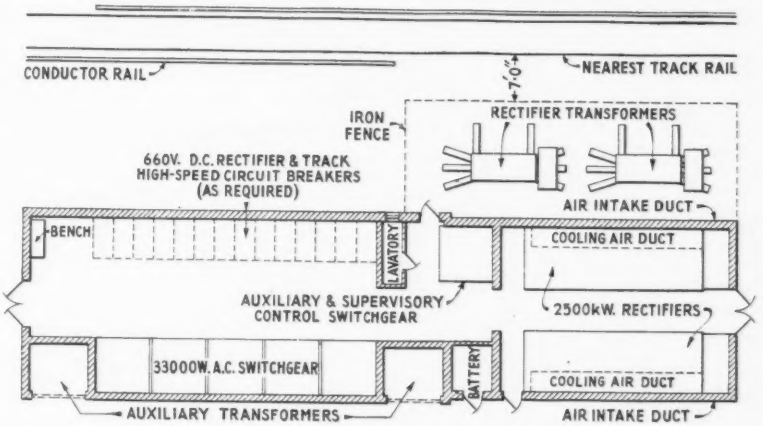
The elimination of pumps and circulating-water cooling systems considerably reduced the maintenance work on pumpless rectifiers, but, as the cylinders could not be made in larger sizes than 1,000 amp., a duplication occurred in certain auxiliary items such as anode fuses, chokes and relays.

Glass Bulb Installations

The London Midland Region had used glass-bulb rectifiers extensively in traction substations, and today had 550 bulbs in service, the aggregate capacity exceeding 70,000 kW. Glass bulbs were installed also by the L.T.E., the total capacity amounting now to over 80,000 kW., some supplying railways, but mostly trolleybuses and tramways. All the installations had given completely satisfactory service at a negligible maintenance cost, and, like the pumpless steel cylinders, the glass bulbs could be exchanged readily when repairs were required. Since glass-bulb rectifiers were constructed in smaller units than the pumpless type, the duplication of auxiliary apparatus was rather greater.

A comparison was made in the paper between total maintenance and operating costs per kilowatt at Southern Region rotary-converter and rectifier substations. In 1948 these costs amounted to 165·64d. at the rotary-converter substations (installed capacity 169,718 kW.); and 61·13d. at the rectifier sub-

(*Continued on page* 336)



Future Southern Region substation, plan and layout

stations and control rooms (installed capacity 289,500 kW.). The difference in personnel for the two systems was also of interest, the totals being as below:—

	46 rotary converter substations	113 rectifier substations
Operating staff ...	207	54
Maintenance staff	59	61
Total ...	266	115

In the Southern Region rectifier substation installations there were five control rooms each controlling 20-30 substations; but although it would be possible to control many more substations on the same system without any great increase of staff, it was not considered good practice for a control room to have attached to it more than 40 substations. The maintenance work on supervisory control apparatus had been found to be very light, two specialist fitters being adequate to supplement the normal servicing staff of the whole Southern Region system.

Future Substation Design

On the subject of future substation design, it was remarked that 33-kV. a.c. switchgear could be arranged for either outdoor or indoor installation. The outdoor arrangement had proved popular where considerable savings in installation could be made by omitting an otherwise necessary building. Experience of this arrangement on the Southern Region had shown, however, the considerable expense in painting galvanised steel parts of the switchgear and the extensive steel fencing required. The modern development of low oil-content and air-blast circuit-breakers had enabled 33-kV. switchgear to be installed indoors without an undue increase in building dimensions, and, unless special circumstances dictated an outdoor arrangement, it was likely that the alternative indoor arrangement would be preferred in future.

The future Southern Region substation building would contain indoor-type 33-kV. switchgear, rectifiers, and 750-V. d.c. high-speed circuit-breakers. It would be a single-storey building, 28 ft. wide and 24 ft. high, and its length would vary according to the number of rectifiers and a.c. circuit-breakers it was to contain. The building would be of brick, and, as the substations were unattended, windows were considered unnecessary. Internally, the building would be partitioned, and cooling air for the mercury-arc rectifiers would be filtered and ducted to the desired positions.

On grounds of expense, much thought had to be given to reducing the number of feeder circuit-breakers. Where single-unit substations were provided, it was possible to eliminate one, or, in certain cases, both of the feeder circuit-breakers, assuming a ring-main system. Another possibility was to employ remotely-controlled power-operated isolators.

Rectifier transformers would be oil-cooled or air-blast cooled according to the nature of the site, and experience had shown that it was an advantage to arrange for cable connections on both primary and secondary sides to permit flexibility in location. To meet the varying conditions of load at different substations, economies were possible by the use of detachable radiators, which permitted a modification of the transformer overload capacity according to circumstances. Difficulties that had been experienced in maintaining transformer cooling tubes in good condition prompted the suggestion that these should be arranged to be easily accessible for painting. To reduce harmonic disturbance to a minimum, the transformers should be designed, and connected, to have the effect of 12- or 24-phase operation.

High-speed circuit-breakers mounted on concrete shelves, under which were mounted the necessary isolating switches and main d.c. busbars, had given excellent service. There was no need to modify this arrangement, except in cases where future possibilities indicated 24-hour services and the lack of opportunity for carrying out adequate maintenance. To deal with this situation, circuit-breakers were available in truck form, but, while this might be suitable for fourth-rail systems, the experience on the Southern Region of serious fires owing to the nearness of earthed metal had indicated that this arrangement was one that required careful application.

Local a.c. and d.c. supplies were required for the auxiliary apparatus necessary for the functioning of the control equipment, and it was often convenient to obtain these from the auxiliary transformer usually provided for signalling purposes. With the nationalisation both of railways and electricity supply, it should be to their mutual advantage that these and other ancillary services were made available from the traction substations by means of an auxiliary ring main.

WOLF ELECTRIC TOOLS: OPENING OF CANADIAN BRANCH.—The opening of a Canadian Branch at 2,271, Bloor Street West, Toronto, 9, is announced by Wolf Electric Tools Limited. Stocks of tools, accessories, and spare parts are available for immediate delivery, supported by a coast-to-coast after-sales service. The management of the branch is in the hands of Mr. John Best.

GREAT SOUTHERN OF SPAIN PAYMENT.—The Great Southern of Spain Railway Company announces that a total of 8,547,803 pesetas has now been received in final settlement of the claim against the Spanish Government for the expropriation of its railway, rolling stock, and assets in Spain. Of the above figure, £84,435 has been received in London in sterling, while 2,398,875 pesetas remain in Spain, to be remitted as and when possible. It is intended to distribute as soon as possible to the first mortgage debenture stockholders the sterling balance at present available, amounting to about £81,320, representing an immediate return of 44½ per cent. on the stock.

British Underground Railway Practice

(*Concluded from page* 333)

remote control and for unattended operation. At present 22 substations were controlled by remote supervision from 5 control stations, and there would be a further 6 substations when all extensions now in hand were completed.

Two control channels were used normally per substation, and this had enabled the operating time to be very considerably reduced besides permitting any circuit to be selected in any order and without appreciable difference in time; also, reversion to single-pair operation was possible should a fault render either pair unserviceable.

Not more than eight substations should be under the charge of a single control room operator. The cumulative time required to restore all essential services after a failure of supply must become excessive if this number be exceeded.

In order to avoid incorrect operation by stray currents from other systems, it was desirable that the track circuits and apparatus concerned with the signalling system be suitable for operation only at 33⅓ c/s, and where substations were energised from stations other than Lots Road and Neasden, this required suitable frequency-changers arranged to produce a single-phase supply at 600 volts and 33⅓ c/s.

These appliances took the form of motor-generators, and all operations for starting the motor and closing the generator on to the signalling busbars were carried out automatically on closing the supply to the motor.

The conductor rail system, consisting of fully insulated positive and negative rails, was divided into six separate sections. Gaps between sections occurred at substation positions, the busbars at these substations being split. Provision was made for certain units of substation plant to be connected to either section. Otherwise the conductor rail system was continuous, being connected through the substation busbars in each case. Any individual section between two substations could be made dead by the circuit-breakers and substation switches.

Further sectionalisation might be provided between substations by means of section switches located near an emergency crossover. These enabled the section beyond the cross-over to be made dead, but in emergency trains could run to an adjacent station and reverse through the crossover.

The use of fourth-rail traction had enabled the signalling adopted to be simple, so far as the track circuits were concerned. There was no common user of the running rails for traction return and signalling, and plain condenser-feed track-circuits were employed.

The paper concluded with a description of the system for switching off the track supply in emergency by pinching together the telephone wires in the tube tunnels.

Extension of the Pacific Great Eastern Railway

New line will open up valuable country and be a link in a future through route to the Peace River area and possibly Alaska

In 1912 the Pacific Great Eastern Railway Company was incorporated to construct and work a line from Prince George—on the Grand Trunk Pacific Railway to the Pacific port of Prince Rupert—to Vancouver, to give the G.T.P.R. access to Vancouver. This line, as then projected, was 470 miles in length. Of this, 360 miles had been opened for traffic by 1921, namely, 347 miles from Squamish, at the head of Howe Sound, to Quesnel, and 13 miles from North Vancouver northwards towards Squamish. Though the formation had been constructed from Prince George to Quesnel, this section was never completed as the company went bankrupt, and the British Columbia Government had to take over its property.

Though the existing line has been run at a loss due to lack of through traffic, the State Government hopes that by linking it up with the Canadian National system, which absorbed the G.T.P.R. at Prince George, its finances will be improved and some valuable country will be opened up. This section has therefore been re-surveyed, a route differing slightly from that originally projected has been approved, and construction works on this 81½-mile extension are in hand.

The area to be served has developed greatly in recent years. Population has increased rapidly, and thanks to Government assistance in clearing the ground and with modern machinery, large areas of arable land have been occupied in the last three years. Good quality crops are being grown in increasing quantities, and livestock breeding is also developing in the excellent grazing areas available, but cattle and sheep still have to be driven up to 100 miles to the nearest railhead. The Government of the State, now one of the wealthiest in Canada, feels justified at last in fulfilling its long-standing promises to the farmers to provide them with a railway.

Traffic Prospects

The extension is expected to bring some 100,000 additional acres into profitable agricultural production. Work on one of several ready-made hydro-electric schemes in this region has begun near Quesnel. The mining and prospecting undertakings, which have greatly increased in this area since the war despite lack of transport, will receive an immediate fillip when the extension is opened. With transport and hydro-electric power this and other industries should produce considerable additional traffic.

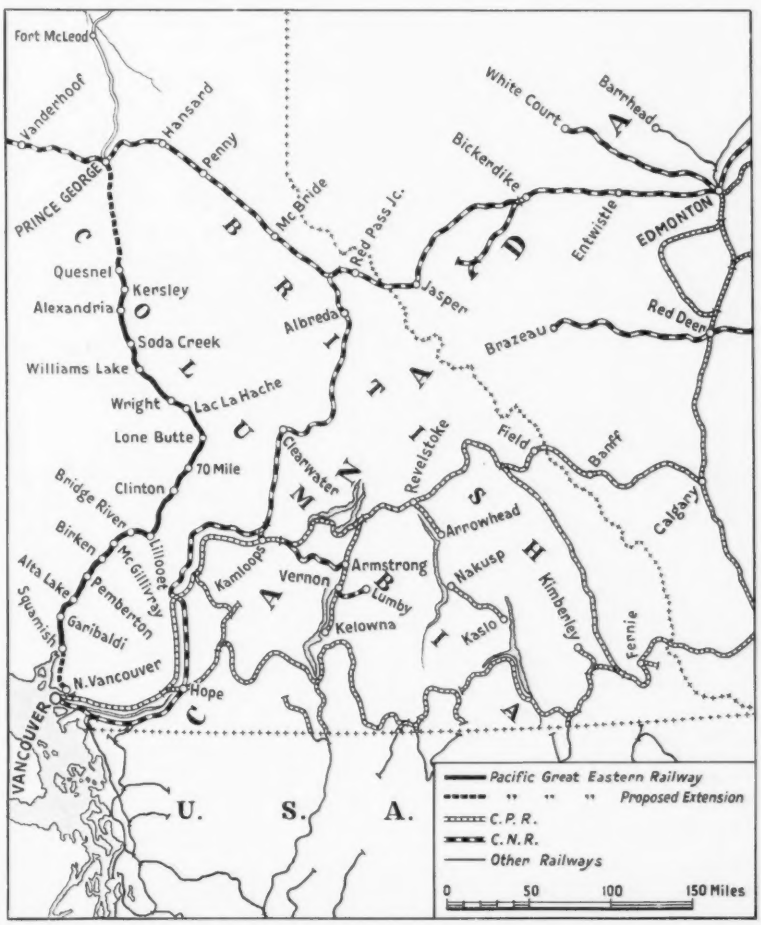
In the area north-east of Quesnel, known as the "great bend" of the Fraser River, there is a widespread and valuable forest area reputed, as a result of surveys, to be the richest on the continent. North and west of Quesnel and beyond Prince George are similar great areas under timber, but not yet surveyed in detail. Much of them is, however, known to be spruce and balsam, the timber from which alpha cellulose is extracted, largely for making nylons and other fabrics. To avoid the long haul on this timber to the coast, the State Government is providing the hydro-electric power at Quesnel for working a pulp mill there. Pulp is therefore another source of traffic to the south and timber from the north.

The already rapidly-developing tourist and holiday traffic of the existing P.G.E.R. line, which is noted for its scenery, should also be enhanced when the extension opens up more beautiful country in the Fraser valley.

This Quesnel-Prince George extension is expected to be only a stepping-stone to others with far wider possibilities. The next is likely to be a 270-mile line from Prince George to Dawson Creek in the Peace River area. It would run first northwards to Fort McLeod, across the Parsnip River valley north-eastwards to cross the Rocky Mountains at Pine Pass, 2,850 ft. above sea level, and finally 140 miles eastwards down into the Peace River Valley to Dawson Creek, the southern terminus of the Alcan or Alaska Highway, and railhead of the Northern Alberta line.

Coalfield Traffic

Not only should this further extension feed the P.G.E.R. with large quantities of grain from the rich Peace River bowl, but it should also form a direct outlet to the American and Canadian cities on the Pacific Coast for the potential output from a new coalfield along the eastern slopes of the Rockies south of Dawson Creek, said to contain millions of tons of the



Railways of Southern British Columbia

best coal in North America. It is estimated that a part of this coalfield would provide traffic even for the extension already under construction to the aggregate quantity of some 200,000,000 tons.

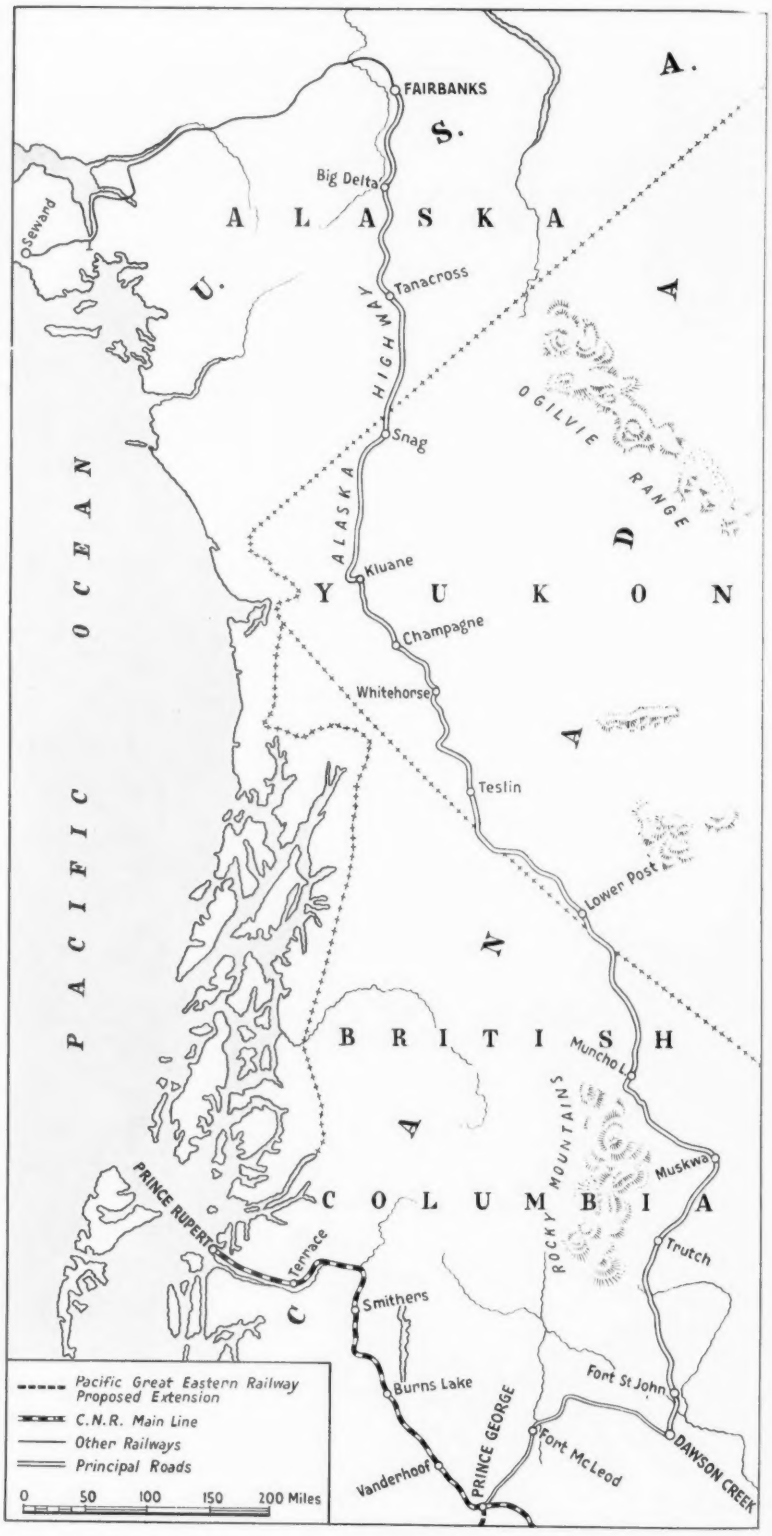
Vancouver-Squamish Link

It will be noticed that despite these extensions nothing definite appears to have been decided as to the future of the gap between Vancouver and Squamish. There is a daily steamer service between them, and the State Government is to improve the port facilities at the latter. Both a railway and a highway have been proposed at different times, but it still seems uncertain whether there will be a through all-rail route unless Canada and the U.S.A. agree it shall be a part of a through strategic railway from the American Pacific Coast cities to Alaska.

Complementary to the extension now in hand, the Squamish-Quesnel line is being rehabilitated at a cost of some $2,500,000. Permanent way renewals, the rebuilding of some concrete retaining walls, and realignments to eliminate doubtful timber trestle bridges are included in this work, which is expected to take about two years to complete. An editorial article on the existing line appears in this issue. Both it and this article are based mainly on information published recently in our American contemporary *Railway Age*.

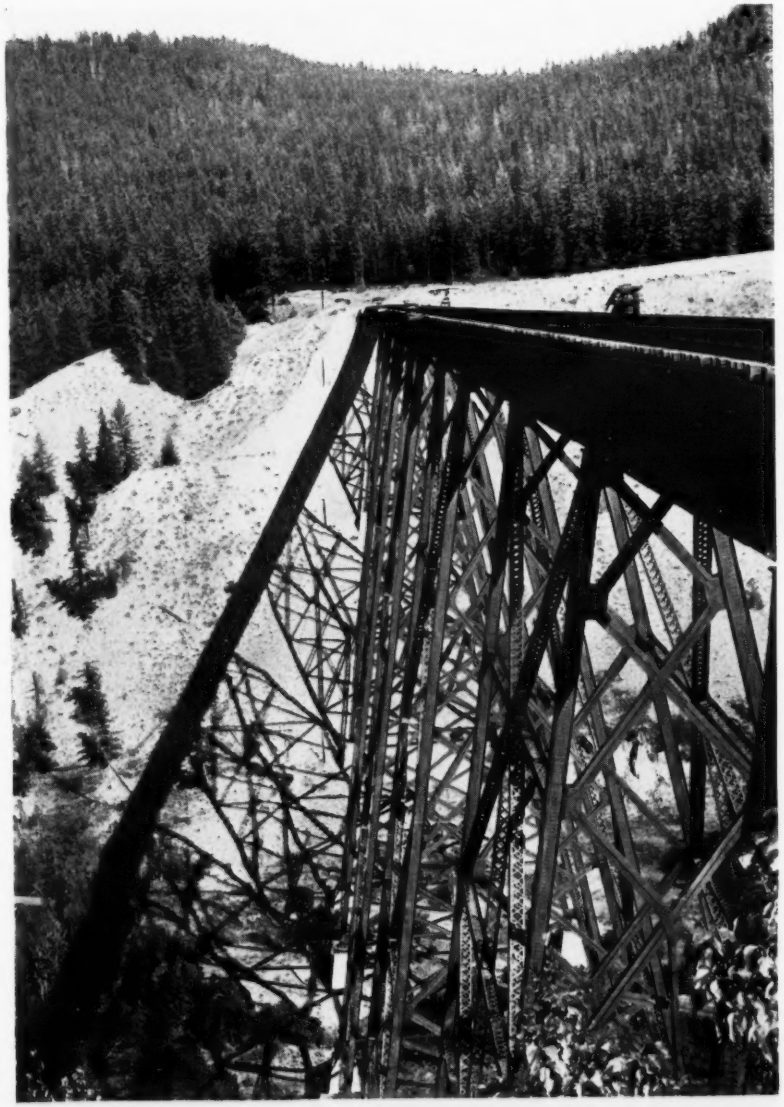
PARTY TRAVEL ON FRENCH RAILWAYS.—The French Railways have increased from 30 to 40 per cent. the reduction allowed for parties of at least 30 adults or paying for that number. The reduction for parties of from 10 to 29 members remains at 30 per cent. The supplement payable for individual return of parties organised by authorised travel agents is now 20 per cent. for party tickets with 30 per cent. reduction, and 40 per cent. for party tickets with 40 per cent. reduction.

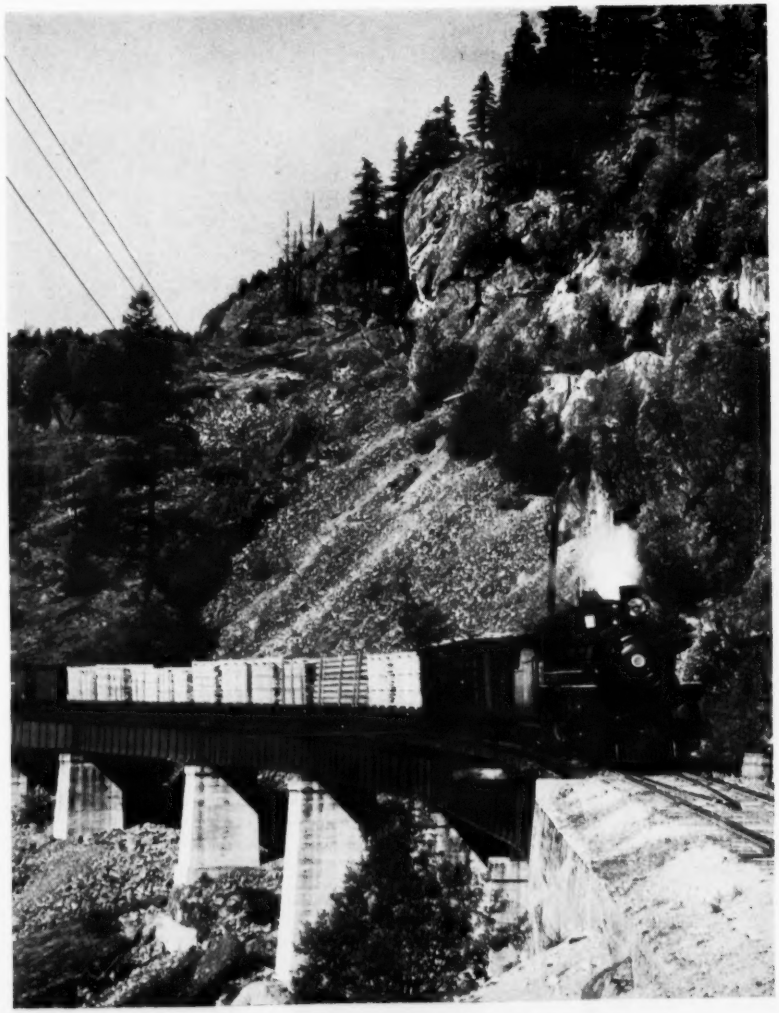
BRITISH TRAVEL & HOLIDAYS ASSOCIATION.—At its resumed meeting on March 17, the Travel Association, which at a previous meeting had failed to agree regarding its proposed merger with the British Tourist & Holidays Board, as recorded in our issue of March 17, carried the resolutions to effect the merger. The combined body will be known as the British Travel & Holidays Association. The Chairman, Sir Alexander Maxwell, who is Chairman of the existing British Tourist & Holidays Board, has been appointed by the President of the Board of Trade; of the 19 members, eight are to be appointed by the Government, seven by subscribers to the new association, and two by the Scottish and one each by the Welsh and Northern Ireland Tourist Boards. Viscount Jowitt, President of the Travel Association, referred to a suggestion that the board of the new association should all be appointed by the President of the Board of Trade, but only after consultation with the interests concerned, and from nominations representing those interests. A vote of thanks was proposed to Lord Hacking, founder and Chairman of the Travel Association, by Mr. Stanley Adams, Chairman of Thos. Cook & Son.



Part of British Columbia, Yukon, and Alaska. The Pacific Great Eastern may be extended from Prince George to Dawson Creek and possibly beyond, forming, with the Alaska Highway, through communication between the U.S.A. west coast and Alaska

Pacific Great Eastern Railway





Above: Freight train crossing bridge at mile 18

Left: Deep Creek Bridge on the Pacific Great Eastern

Pacific Great Eastern Railway

Running depot, with Pacific locomotive in foreground

Williams-Lake Station on the Pacific Great Eastern Railway

Improved Methods of Locomotive Shed Lighting

Fluorescent lamps for local lighting of mechanism under repair and for the general illumination of premises

Two fluorescent lighting trolleys in use at Willesden motive power depot, L.M.R., during maintenance work on a rebuilt "Patriot" class locomotive

THERE is an indication of the difficulties with which railways sometimes have to contend in lighting their premises in the statement that the planning of the architecture and illumination of a building should go hand in hand. Most railway buildings date from a period some time before the invention of those light sources on which modern ideas of lighting are based, and the introduction of new illuminants cannot, therefore, always follow ideal lines. Locomotive sheds are an example of this, for, though the desirable course often might be a complete overhaul of the general lighting system, coupled with structural alterations, the immediate importance of providing conditions conducive to efficient work demands a measure of improvisation.

Attention was directed to the need for improvement in shed lighting by the Gowers Report on "Health, Welfare, and Safety in Non-Industrial Employment." Effective local lighting for inspection and maintenance can bring immediate benefit without waiting for larger schemes, and is an application for which the modern fluorescent lamp has several advantages.

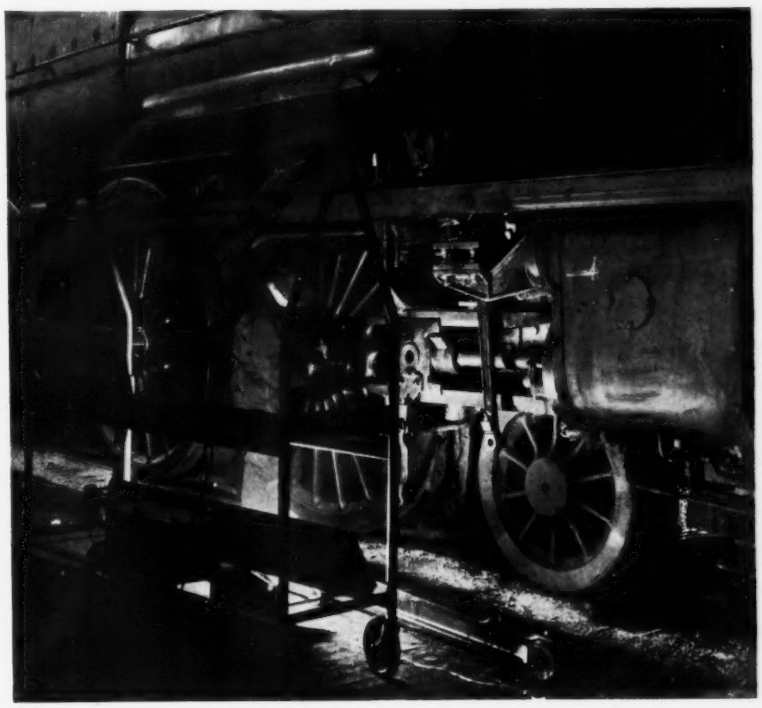
Trolleys for Local Lighting

At certain sheds on the London Midland Region of British Railways some trolleys for local lighting are in use which were made up by manufacturers of lighting equipment to the requirements of the railway. The examples illustrated are units manufactured by the General Electric Co. Ltd. and in use at the Willesden motive power depot. They are of welded-steel tube construction and are mounted on four 9-in. dia. rubber-tyre castor wheels for easy mobility. Each carries two 5-ft. 80-W. lamps in reflector fittings with toughened-glass covers. The lower fitting is fixed, but the upper one is carried on a counterbalanced frame that can be rotated through some 57 deg., so that the lamp can be set at any height above the ground between about 5 ft 2 in. and 7 ft. 10 in. Independent adjustment of the angle of the upper fitting is provided by a large handwheel and chain drive.

With such a trolley, considerable areas of the motion, or other parts, of the locomotive can be evenly illuminated, and the adjustable top lamp facilitates work on items in positions where the running plate, or the curve of the boiler, for example, call for a particular height and angle of lighting.

Dazzle Reduced

The trolley is easy to manœuvre into a convenient position, and eliminates both the need for finding places to stand, or hang, hand lamps, and the risks of breakage present when such lamps are used. Little shadow is cast on the work, because of the length of the fluorescent light source, and the low surface brightness of the lamps reduces dazzle when they come into the line of sight as the men move about at their work. The lamps are cool burning, so that a high level of illumination is provided without the discomfort that might be caused in some conditions by a battery of powerful tungsten lamps.



Motion details illuminated by the fluorescent lamps on trolley positioned for local lighting; lower deck of trolley carries transformer equipment

The lighting supply in the shed is 50 V., and sockets for the connection of local lighting equipment are provided on the roof pillars. The base of the trolley, therefore, carries a transformer to step the voltage up to 230 for the fluorescent lamps, together with the lamp starters, chokes, and capacitors, all this equipment being inside a protective casing.

On the outside of the case there are placed individual switches for each lamp, an input plug and socket, and a 50-V. output socket for supplying a tungsten hand-lamp. The armour plate glass fronts of the reflector fittings are hinged to give access to the lamps and are secured by captive screws. A tool tray is fitted to the trolley framework 3 ft. above the ground.

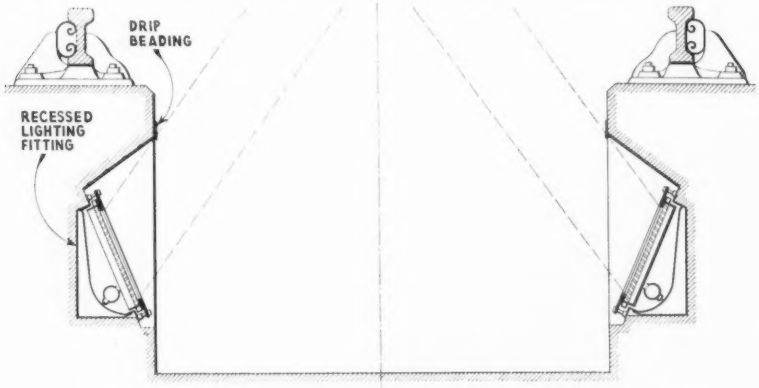


Fig. 1—Scheme for fluorescent lighting of locomotive inspection pit, showing depth of recesses

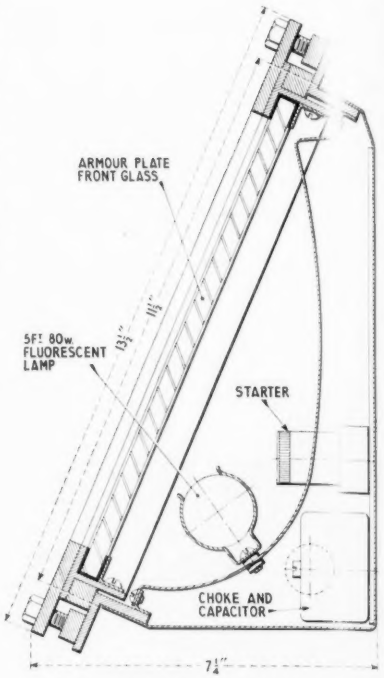


Fig. 2—Section through G.E.C. pit lighting fitting

Inspection Pit Lighting

Some of the qualities of fluorescent lamps mentioned are very desirable in inspection pit lighting, particularly the low surface brightness, as the men necessarily work close to the lamps and often have them at eye level. Suitable reflector fittings may be mounted flush with the pit walls, but for locomotive work, an arrangement which emits the light at a higher angle is sometimes found preferable for providing illumination right up to the under side of the boiler.

One arrangement is shown in Fig. 1, where it will be seen that the placing of the fittings in a recess at each side of the pit gives some protection from oil, water, and steam coming from locomotives on the pit, as well as enabling the front glasses to be fixed at the desired angle for upward lighting. The fittings shown are a G.E.C. design for a 5-ft. 80-W. lamp. In the sectional view, Fig. 2, it will be seen that the starter switch projects through the reflector, with the result that both lamp and starter can be replaced readily from the front.

Apart from the special fittings described, a number of standard types for fluorescent lamps are being installed at locomotive depots for lighting offices, locker and mess rooms, passages, workshops, and other accommodation. For such ancillary premises the Gowers Report recommended minimum standards not lower than those prescribed by the Factories Act, and it was clear from the evidence of witnesses before the Committee of Enquiry that much importance is attached by staff to lighting as a primary requisite of good working conditions.

New Zealand Railways Inspection Train

THE photograph reproduced on the right shows the special train which conveyed Sir William Halcrow, Past-President of the Institution of Civil Engineers and Senior Partner, Sir William Halcrow & Partners, Consulting Engineers, and Mr. J. P. Thomas, formerly General Manager (Railways), London Passenger Transport Board, on a tour of the Auckland suburban railways when they visited New Zealand last autumn at the invitation of the Government to report and advise on transport and city planning in Auckland.

In the illustration the train, which consists of a Class "WAB" 4-6-4 tank locomotive, No. 772, of a type used on the various surburban services from Auckland, and one coach, is seen leaving Auckland Station.

Photo] [W. W. Stewart

4-6-4 tank locomotive and coach conveying Sir William Halcrow and Mr. J. P. Thomas on a tour of Auckland suburban lines

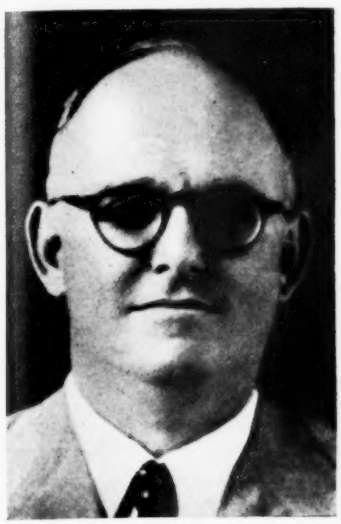
RAILWAY NEWS SECTION

PERSONAL

Mr. R. M. T. Richards, Deputy Chief Regional Officer, Southern Region, British Railways, is retiring next month.

The Minister of Transport has accepted, with regret, the resignation of Sir Ernest Murrant from his appointment as a part-time Member of the Docks & Inland Waterways Executive. Sir Ernest Murrant has been told by his medical advisers to reduce the number of his business commitments.

Mr. Carmelo Adolfo Pizzorno, who, as recorded in our January 27 issue, has been appointed General Manager of the General Bartolomé Mitre (former Central Argentine) Railway, is 51 years of age, and started his railway career in 1922 with the Argentine State Railways as Assistant Engineer on the construction of the Concordia branch. In 1929 he was appointed Assistant Engineer for construction of the Metán to Barranqueras branch, and, in January, 1931, Second Chief Engineer for construction on the Concordia branch. In October, 1931, he received the title of Engineering Inspector, being located at the same place. In 1937 he became Chief Engineering Inspector for construction on the Paraná to Maria Grande branch, and in 1944 was made Chief Engineer for construction on the Salta to Socompa branch, retaining that post until December, 1948. At that date he was appointed General Manager of the Patagonian National Railway, a post he now vacates.



Mr. C. A. Pizzorno

Appointed General Manager, General Mitre (former Central Argentine) Railway

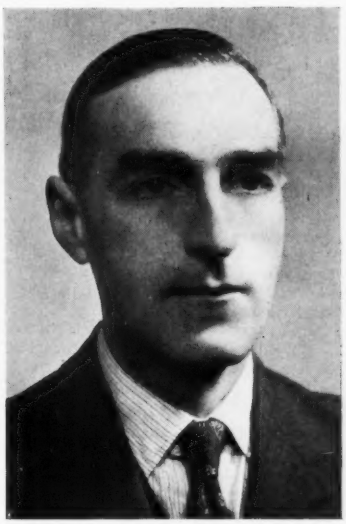
Mr. F. A. A. Menzler, Chief Development & Research Officer, London Transport Executive, has been elected the next President of the Institute of Actuaries, and will take office in June. This is the first occasion on which the distinction is being conferred on one who serves outside the more conventional professional fields represented by the life assurance offices, the Government Actuary of the day or an actuary distinguished in consulting practice.

Mr. H. M. Jagtiani has been appointed General Manager of the East Indian Railway.

Mr. M. Kanagasabay has been confirmed in the post of General Manager, Ceylon Government Railway.

Sir Arthur Griffin, Director & General Manager of the Rhodesia Railways, recently arrived in Great Britain. He is accompanying Sir Godfrey Huggins, Prime Minister of Southern Rhodesia, who is heading an official delegation to a conference on British investments in Rhodesia.

Mr. D. W. Hadfield, M.I.Mech.E., M.I.Loco.E., who, as recorded in our March 17 issue, has been appointed General Manager of Robert Stephenson & Hawthorns Limited, with charge of its locomotive works at Darlington and Newcastle-on-Tyne, received his engineering training at the L.N.E.R. Gorton and Dukinfield Works, and at the Manchester College of Technology. He joined the Burma Railways in 1927, as Assistant Carriage & Wagon Superintendent, and subsequently served as Locomotive Works Manager, Carriage & Wagon Works Manager, and District Locomotive Superintendent. During the 1942 campaign in Burma he received a commission in the Burma Army, and was mentioned in dispatches. After evacuation to India he served for six months as Staff Major at G.H.Q. (India) in 1943, and was then seconded to the Government of India Supply Department as Director, Railway Wagons, until 1945, in charge of planning the Railway Board's wartime wagon-building programme. Mr. Hadfield returned to Burma in November, 1945, as Deputy Chief Mechanical Engineer (Carriage & Wagon), and took a leading part in the post-war restoration of devastated workshops and rolling stock. After four months in the Burma Office, Whitehall, on special duty connected with the acquisition of new rolling stock for the Burma Railways, he returned to Burma as Deputy Chief Mechanical Engineer (Locomotive). He was appointed in April, 1947, to officiate as Chief Mechanical Engineer, and was confirmed in that post in January, 1948. After retiring from the Burma Railways in April, 1948, Mr. Hadfield was engaged as an engineer in the London office of Rendel, Palmer & Tritton until the end of 1949.



Mr. D. W. Hadfield

Appointed General Manager, Robert Stephenson & Hawthorns Limited

We regret to record the death on March 14, at the age of 84, of Mr. Robert Carrington Willis, who retired in 1930 as Registrar of the London Midland & Scottish Railway Company.

Mr. M. G. Lemaire, who, as recorded in our February 3 issue, has been appointed Head of the Railways Section, Transport Division, United Nations Economic Commission for Europe, in Geneva, was born on November 4, 1889, in Marchienne au Pont, Belgium. After completing his secondary school studies, he joined the Belgian State Railways at the age of 18. He qualified to become a Chief of Section and Technical Inspector in the Motive Power Service, and in 1911 took up duty in a large locomotive repair works. On the outbreak of war in 1914 he was appointed to the direction of military railways, and attached to Belgian General Headquarters; and after the war resumed his previous duties for a year. He then directed a locomotive depot, after which he was appointed to the Direction of Material & Motive Power in Brussels, where he dealt with statistics and compensation. In 1926, on the creation of the Belgian National Railways Company, he was appointed to the Department of Finance as Second Assistant Director. He became First Assistant in 1938, and Director in 1946. In his new post with the Economic Commission for Europe, Mr. Lemaire will be concerned with such varied problems as the identification of railway wagons, post-war restitution and re-distribution of wagons, standardisation of rolling stock and brakes, automatic couplings, renewal of rolling stock, a uniform system of railway accounting and rail transport safety.

Mr. M. G. Lemaire

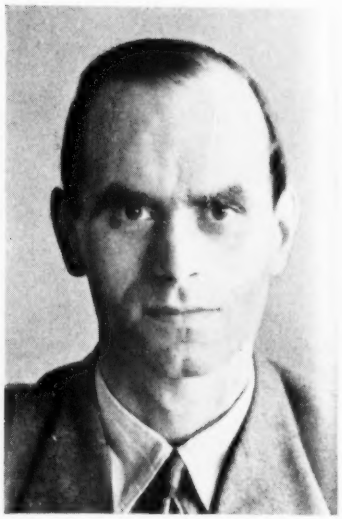
Appointed Head of Railways Section, United Nations Economic Commission for Europe

Mr. D. I. Grant

Appointed Secretary of the Canadian National Railways and subsidiary companies

Mr. W. H. Kyle

Appointed Assistant Vice-President, Operation, Canadian National Railways



Mr. R. M. L. Lemon

Appointed Administrative Assistant to General Manager, East African Railways & Harbours

Mr. Douglas I. Grant, K.C., who, as recorded in our March 10 issue, has been appointed Secretary of the Canadian National Railways and subsidiary companies, was born at Orillia, Ontario, on February 1, 1901. He entered the Law Department of the C.N.R. as a Solicitor at Toronto in 1930, and in February, 1948, was appointed Assistant Secretary of the company. He became a King's Counsel in 1946.

Sir George Nelson, Chairman & Managing Director of The English Electric Co. Ltd., has been elected a Director of Lloyds Bank Limited.

We regret to record the death on March 18 of Mr. John Edward Wood, District Motive Power Superintendent, Newport, Western Region, British Railways.

Mr. Alfred Iddies, President of the Babcock & Wilcox Company, New York, has been appointed a Director of Babcock & Wilcox Limited, in place of Mr. A. G. Pratt, who has resigned his seat on the board.

Mr. W. H. McFadzean, Deputy-Chairman of British Insulated Callender's Cables Limited, has been appointed also Chief Executive of the company. He is relinquishing all other directorships, but expects from time to time to maintain his overseas visits. Dr. L. G. Brazier has been elected to the B.I.C.C. board retaining his position as Director of Research, and Mr. H. J. Stone has also been elected to the board.

Mr. Willard H. Kyle, B.Sc., who, as recorded in our March 10 issue, has been appointed Assistant Vice-President, Operation, Canadian National Railways, was born in Montreal on May 10, 1903, and is a civil engineer, having obtained his B.Sc. degree at McGill University in 1926. He became associated with the C.N.R. during the summer seasons of 1924 and 1925, when he served as a chainman in the General Superintendent's Department at Montreal, and after graduation joined the railway as an instrument man at Montreal. He was appointed Assistant Engineer in 1929, and became Division Engineer, Transportation Department, in 1939. In 1942 he was made Assistant Superintendent of the Passenger Terminal at Montreal, and in the next year he became Superintendent, Montreal Terminals & St. Jerome Division. In 1946 he was appointed General Superintendent, Northern Ontario District, and in 1948 returned to Montreal as General Superintendent, Montreal District. Mr. Kyle was appointed General Manager of the Central Region, with headquarters at Toronto, in 1949.

We regret to record the death on March 14, at the age of 61, of Mr. T. Bowling, A.C.A., European Auditor of Canadian National Railways.

Lt.-Colonel T. Child is relinquishing his position with W. & T. Avery Limited as Manager of the Testing Machine Division, on being appointed General Manager of the British Engineers Small Tools & Equipment Co. Ltd.

The London Transport Executive announces that Mr. L. B. Hewitt, hitherto Works & Divisional Engineer (Rolling Stock-Trams & Trolleybuses), has been appointed Stores Standardisation Officer in the Department of the Chief Technical Planning & Supplies Officer.

Mr. R. M. L. Lemon, who, as recorded in our March 17 issue, has been appointed Administrative Assistant to the General Manager, East African Railways & Harbours, was educated at Malvern College and at Balliol College, Oxford, and obtained his early transport experience with Pickfords Limited, Hay's Wharf Cartage Co. Ltd. and the London Passenger Transport Board. He joined the Great Western Railway in 1938, and underwent a three year course of special training in the Traffic Department. From 1940 to 1946 he served with the Royal Engineers (Transportation), from 1943 to 1945 he was attached to the Railway Board, Government of India, and in 1946 he was transferred to the Transport Division of the Control Commission for Germany, as Deputy-Controller (Operating) for the railways in the British zone. He was demobilised in May, 1946 with the rank of Lt.-Colonel, and rejoined the G.W.R. later in the same year. Mr. Lemon's last substantive post before his present appointment was that of Chief Clerk to the Divisional Superintendent, Exeter.

Mr. R. S. V. Barber has joined the H.B. Concrete Co. Ltd. as Technical Consultant to the Board of Directors. Mr. Barber has for many years been engaged technically and commercially in the development of pre-stressed concrete, on the production of which it is the company's intention to concentrate.

We regret to record the death on March 10 of Mr. Charles J. Foster, who retired on December 31, 1948, from the position of District Traffic Superintendent, Perth, Scottish Region, British Railways.

Mr. C. F. I. Ramsden, Overseas Director, Federation of British Industries, recently left this country for a two-months tour of the Middle East.

PAKISTAN RAILWAY STAFF CHANGES

Mr. Z. H. Khan, who was appointed Secretary (Communications & Railways) to the Government of Pakistan on its establishment in August, 1947, has retired.

Mr. S. M. Hasan, Director, Establishment, Railway Division, Ministry of Communications, has been appointed Chief Engineer (Construction), Eastern Bengal Railway, Chittagong.

The second Commonwealth Conference of Representatives of Engineering Institutions is to be held in Johannesburg next month, and the following Institutions are to be represented by their Presidents and Secretaries as follows:—Institution of Civil Engineers: Mr. V. A. M. Robertson, President, and Mr. E. Graham Clark, Secretary; Institution of Mechanical Engineers: Dr. S. F. Dorey, President, and Sir Henry Guy, Secretary; Institution of Electrical Engineers: Professor E. B. Moullin, President, and Mr. W. K. Brasher, Secretary. These officers sailed on the *Capetown Castle* from Southampton on March 23. While in South Africa they will take the opportunity of meeting members of their own Institutions in the Union and in Southern Rhodesia. The party will return to England in May.

Increased Freight Charges Recommended

Summary of reports by the Charges Consultative Committee on the application by the B.T.C. for an increase in railway and canal charges

The report* of the permanent members of the Transport Tribunal sitting as a Consultative Committee to advise the Minister of Transport as to the application by the B.T.C. for an increase of 16⅔ per cent. in railway freight charges was published on March 17. Their further report on the application for higher charges for harbours, docks and canals was issued at the same time, and in both reports it is recommended that the B.T.C. be given authority to make the proposed increases.

The report dealing with the proposed increase in railway freight charges states that the main question debated was whether the B.T.C. in 1950 ought not to show a substantially better result than was estimated from the operation of all its activities. The submissions made as to the means by which a better result ought to be secured assumed higher receipts and far greater economies than were allowed for; the latter was by far the most important issue.

The principal attack on the estimate for 1950 was that of the British Iron & Steel Federation, whose submissions covered the objections of practically all the other critics. It urged that in a total for railway working expenses of upwards of £300 million economies of a good deal more than the £2-£3 million allowed for ought to be realisable. The drive for efficiency in industry had produced an increase of some 5 per cent. in productivity per man year, and the Federation, while recognising that conditions in the transport industry were not the same as those of other industries, contended that efficient management should produce similar economies, though not perhaps at quite such a high level.

Estimated Economies

The estimated economies in 1950, states the report, appeared disappointingly small, but in the circumstances one could only assume that those responsible for the conduct of B.T.C. activities were best able to forecast what economies they were likely to achieve, and there was no justification for rejecting the evidence of the Comptroller of the Commission. As to the estimated receipts for passenger traffic on British Railways in 1950, the Federation submitted that the fall compared with 1949 would be £2,500,000 less than the £7,000,000 estimated, but in view of the continuing downward trend in passenger receipts, the Committee thought they should adopt the views of the Commission.

With regard to freight traffic on British Railways, the Committee expresses the opinion that, because of the growing competition of vehicles operating under "C" licences, there was doubt whether even the B.T.C. estimate would be reached. On a conservative estimate, such of these vehicles as exceeded 1½ tons unladen weight were likely to carry some 270 millions tons in 1950, against 130 million tons in 1946, while the total freight carried by the railways in 1946 was 263 million tons, and the estimate for 1950 was 276 million tons; nevertheless, they were prepared to accept the estimate. As to the mineral classes, the Committee again accepted the estimate.

With regard to revenue from the Road Haulage Executive, the B.T.C. took a conservative view and contended that if this source should yield an additional £1,000,000 in 1950, this would only suffice for the interest on the stock issued for the purchase of the vehicles. The Federation submitted that the additional revenue from this source should be £2,000,000 in 1950 and £4,000,000 in 1951. These figures led the Committee to believe that the estimate of revenue from this source might be too low, but the extent to which this might have been underestimated would not materially affect the deficit estimated for 1950.

The conclusion was reached that in 1950 neither the receipts nor the economies in respect of the operations of the Commission would be greater than allowed for in the estimate and that a deficiency of approximately £30 million was to be expected in 1950.

An important issue to be determined was whether the conditions which were expected to produce this deficit in 1950 were likely to continue or not. If these conditions were permanent, then it was essential that the charges should be increased, and, therefore, they had to consider what were the prospects of the Commission looking beyond 1950 to the time when a Charges Scheme had been brought into operation and rail and road traffic could be integrated.

The submission of the Federation that by 1952 the Commission might be expected to be paying its way could not be accepted. It was considered that in 1951 and 1952 the deficits at present charges were not likely to be materially less than estimated for 1950. On the basis that a Rail & Road Charges Scheme might be brought into force in 1952, the accumulated deficit on the present view of the Comptroller of the Commission would be in the region of £100 million, and that deficit would have to be liquidated. Looking at the matter in regard to the interests of the users of the services, any attempt to liquidate such a deficit through the medium of the Charges Scheme would be highly detrimental to such users and to the Commission.

The conclusion was that as far as could now be foreseen a deficit in the region of £100 million might well have accumulated by the middle or end of 1952, and that it was in the interest of the users and of the Commission that steps should now be taken to secure additional revenue.

The next issue for them to determine was how the additional sums required could best be raised. The submission of most of the representative bodies appearing was that it should be by the appropriate percentage increase levied on all traffic, including passengers. The B.T.C. proposal was that it should be authorised to make the same percentage additions to all freight charges on British Railways without any addition to passenger fares. Ordinary fares were excluded, because an increase would not produce additional revenue, but was more likely to result in less revenue than would be obtained at present fares.

Attention was drawn to the increase in industrial production during 1949, an increase which was largely responsible for a somewhat similar percentage increase in the level of wages, and it was submitted that both these production and wages increases might be expected to continue during 1950, and so more money would become available which would enable people to travel in spite of high fares. The Committee found it difficult to believe that there would be such an increase in spending power in 1950 that increased railway travel might be expected, nor did it see any convincing signs that the steady decline in receipts from this source had been checked, and it agreed that no additional receipts could be obtained by increasing ordinary fares.

Preferential Rates Rejected

The Committee was not of opinion that a higher percentage addition should be made at the present time to other rates so that a lower percentage should be applied to coal rates, and it considers that whatever case there might be for differentiating in favour of coal must be left for consideration when the Charges Scheme was presented. No specific criticism was directed to the proposed "smalls" scale.

One certain effect of increasing charges would be to divert some traffic, and they estimated that this diversion would reduce the theoretical additional yield of a 16⅔ per cent. increase from £36,200,000 to an actual yield of £26,300,000. In view of the evidence of the coal interest that no diversion of coal traffic was to be anticipated, this loss might be to some extent overstated, but as it was considered that increased charges in other classes of traffic would intensify the competition of "C" licence vehicles, it was considered that the net yield from the increased rates would not exceed the estimate.

All the bodies consulted represented in the strongest terms the damage they anticipated to the industrial economy of the country from the increases proposed and the consequential effect on the cost of living index. They had, therefore, considered whether they should advise that the increase should be postponed for a time. They were satisfied that it could not be postponed until the Charges Schemes were brought into force, and as they saw no reasonable hope that conditions might be so changed within, say, a year that the increase would not then have the effect on industry so greatly feared at the present time, and, having regard to the detriment of such delay on the finances of the B.T.C., they did not advise postponement.

Dock and Canal Charges

The report on the application for higher dock and canal charges states that there was no ground for thinking that there was any lack of efficiency in the conduct of the dock or inland waterways undertakings. Nor were there grounds for thinking that additional economies could now be effected to secure that end in the immediate future. Bearing in mind the statutory obligations of the Commission, its need for additional revenue and that the dock and inland waterways were sources from which some additional revenue could be obtained if additional charges were authorised, they recommended that the additional charges sought to be made should be authorised.

The Committee endorsed the Chamber of Shipping claim that ports in Eire should be considered as within coastwise traffic.

* "Reports of the Permanent Members of the Transport Tribunal sitting as a Consultative Committee under Section 82 of the Transport Act, 1947" (No. 55-280). H.M. Stationery Office. Price 6d.

Institution of Locomotive Engineers Annual Luncheon

Tributes to contributions of British engineers to the development of railways in Africa

The annual luncheon of the Institution of Locomotive Engineers was held at the Dorchester Hotel, Park Lane, on Friday last. Mr. W. Cyril Williams, President of the Institution, was in the Chair.

Mr. Leif Egeland, the High Commissioner for South Africa, who proposed the toast of "The Institution," said that many members of the Institution had already paid a distinctive role in transport development in Africa. On behalf of South Africa, he expressed appreciation of the great contribution which the British locomotive engineer had made to the development of railway practice in South Africa, not least in the early years of the present century when so much of the equipment and staff had come—as it happily still came—from this country. In every delivery of rolling stock to the Union, there was a link with some member of the Institution. South Africa also profited by the continuing improvement in design and efficiency of rolling stock constructed in the United Kingdom.

The North British Locomotive Company had delivered recently to the South Africa Railways the 2,000th locomotive which this firm alone had exported to South Africa. Since the recent war, Great Britain had delivered to South Africa 548 steam locomotives and 38 electric locomotives, representing an expenditure of £15,000,000 sterling. This was exclusive of large electric locomotives of 2,500 h.p. at present under construction in this country at a cost of over £1½ million sterling. Orders for coaches in course of delivery and partly delivered totalled 377 units at a cost of some £4½ million sterling. Nearly 2,700 wagons had been delivered representing another £3½ million and bringing the total post-war deliveries to the Union to over £23½ million. In 1946 Great Britain had also supplied to the South African Railways Administration the luxuriously appointed Royal Train for Their Majesties' visit in 1947.

Developments in railways in South Africa were constantly under review, and with its 3 ft. 6 in. gauge, the achievements to date had been noteworthy with the huge steam, electric and Garratt-type locomotives. The largest Garratt locomotive in the world working on a 3 ft. 6 in. gauge on a 60-lb. track was in South Africa; it was a tribute to the careful design of a British manufacturer to meet a stringent specification governing axle loading.

The name of the President, Mr. Cyril Williams, was a household word in the locomotive engineering world and not least as a specialist in regard to a Garratt articulated locomotive. He was a globe-trotter—tireless, purposeful and dynamic—one whose articulateness, like that of his Garratts, had only been exceeded by his mobility. He was the first President of this Institution who had served his apprenticeship and mastered his trade overseas—and in South Africa at that.

President's Response

Mr. W. Cyril Williams, responding to the toast, said he was particularly pleased to welcome the High Commissioner for South Africa, Mr. Leif Egeland, the High Commissioner for Southern Rhodesia, Mr. Goodenough, and the East African Commissioner, Mr. Norton. The growth of railways in these last few countries was positively alarming and equipment could not be delivered quickly enough to cope with the phenomenal increase. There was a great stir going on in the mighty African continent. As the different railways approached each other, problems were increasing. The next few years would see an unprecedented development there.

He regretted the absence, through indisposition, of Dr. Querioz, the Chargé d'Affaires of Portugal and the Portuguese Colonies, who would have represented Angola and the Mozambique territory. He was also sorry that Mr. Douglas Lorimer, of the North British Locomotive Company, could not be there. As Mr. Whalley, of Vulcan Foundry, and Mr. Wilmot, of Beyer, Peacock, were present, he would have liked to have made the trio complete. He was also very pleased to see his old chief on the South African Railways, Colonel Collins.

Wide Membership

The membership of the Institution embraced the whole railway equipment world and those present could design locomotives, carriages, wagons, accessories and everything that serviced them, and even sell them. He did not apologise for mentioning selling, because this country had to sell to live, and it was the business of the Institution by research, knowledge, perfection in design and economy in manufacture to make it easier for British railway equipment to be sold overseas. The Institution, although small, was highly specialised. It had nearly 2,000 members; it had lost the South American centre, due to changes in Argentina, and in his opinion that great country was the loser.

He was a great believer in visiting the other fellow's country and finding what suited him. The more that members representing railway equipment went overseas and, what was just as important, the more that overseas railway officials visited us, the greater would be the advance, the improvement in efficiency and the reduction in transport costs.

The Institution was very fortunate in having Mr. R. A. Riddles, a Member of the Railway Executive and controller of mechanical engineering on the largest railway system in the world, to be its next President. Not only had Mr. Riddles reached the top of the tree in locomotive engineering, but he was liked and admired by them all, and despite his great position was still approachable.

Mr. Wilmot's Toast to Guests

Mr. Harold Wilmot, President of the Locomotive Manufacturers Association of Great Britain, who proposed the toast of "The Guests," said that the Institution for many years had enjoyed an enviable reputation for the popularity of its functions. No institution in Great Britain liked more to entertain its guests, or had a higher reputation for the entertainment that it provided. Of a total of 563 persons present at the luncheon, 299 were guests. That number included many important personalities, associated with railways in many parts of the world, and the continent of Africa was particularly well represented. He had been a close friend and colleague of the President for a quarter of a century and it gave him the greatest pleasure to propose the toast.

Mr. D. C. Woodward, General Manager, Nigerian Railway, who responded, said he appreciated the honour which had been paid him by the invitation to reply for the guests and he felt it also reflected favourably on Nigeria, with which he was closely associated. Recently there had been a good deal of publicity directed towards Nigeria as a result of the groundnuts scheme, and that had served to draw attention to its railways. On the Nigerian Railway 381 white officers were part of a total personnel of 23,000 employees. He went on to give some interesting details of railway conditions in Nigeria and pointed out that not enough was known in Great Britain about the local difficulties and problems which were encountered in Nigeria, and which were quite dissimilar to anything in this country.

Mr. Bunning on Colonial Development

Mr. A. J. F. Bunning, Adviser on Inland Transport to the Colonial Secretary, seconded the response to the toast, and said much of the accent on the speeches had been on overseas territories and particularly on Africa. He realised to the full what a great ambassador of goodwill Mr. Cyril Williams had been in overseas territories. At the present time several conferences were in being or projected, with the object of bringing together and pooling ideas for the development of the African territories. The present tendency was to endeavour to develop a territory and its transport at the same time, and not to have different forms of transport growing up haphazardly and in competition. The scope which was provided by the Colonial territories might be judged from the fact that in the African territories alone which came under the Colonial Office, the amount of capital investment in transport development was £100 million. To a very large extent that sum was being found by the territories themselves. It gave a good indication of the size of the market which was available to locomotive manufacturers and others.

Mr. R. A. Riddles, the President-Elect, said that if he was endowed with the enormous personality of the President, or the tractive effort of a Garratt locomotive, he would have less temerity in accepting the offer which had been made him in his election as President for the ensuing year. He had always had the interests of the Institution at heart and he would continue to do so.

Among those present were:

Messrs. N. L. Ablett, F. W. Abraham, E. Adams, J. L. Adamson, W. A. Agnew, Don Jaime Alba, T. J. Aldridge, L. B. Alexander, A. L. Allpress, E. Allsop, H. Andrew, J. C. Ansaldo, M. Anuszewski, B. W. Anwell, S. Appleyard, R. Arbuthnott, J. C. Armstrong, S. V. Arnold, W. J. Ash.

Messrs. G. H. Bailey, E. W. Baker, A. J. Ball, F. J. Bance, S. Barber, D. S. M. Barrie, V. M. Barrington-Ward, W. A. Bartley, G. H. Batty, A. H. Baughn, A. E. Beacham, R. Bean, F. H. Beasant, P. C. Beastall, J. E. Beckett, R. A. Beckett, G. V. Beesley, Colonel B. K. Benner, Messrs. A. E. Bennett, H. Bennett, J. P. Bennett, J. V. Beswick, R. Beswick, Colonel Biddolph, Messrs. F. Billington, C. K. Bird, H. Bissell, P. J. Bissell, B. R. Blackman, C. N. Blakeney, A. B. Boath, R. C. Bond, Lt.-Colonel H. K. Bostock, Messrs. L. Boulton, A. J. Boyd, T. W. Bragg, E. Brearley, K. W. Bridges, G. C. Brighten, G. C. Brinkworth, G. D. Broadbent, D. C. Brown, D. F. Brown, C. E. Broxup, E. Bucklow, C. Bullard, O. V. S. Bulleid, A. J. F. Bunning, M. G. Burrows, D. C. Burton.

Messrs. N. G. Cadman, W. T. S. Cairns, Sir John Calder, Senior Crown Agent, Messrs. J. Calderwood, K. R. M. Cameron, A. Campbell, C. R. Campbell, J. Campbell, T. A. Campbell, Colonel K. Cantlie, Messrs. G. Carr, H. R. Carver, Lt.-Colonel W. E. Castello, Messrs. J. Cave, H. D. Chamberlain, M. R. Chapman, A. T. Cheesley, T. E. Chrimes, J. M. Chrystal, Colonel H. E. Clark, Messrs. D. G. Clarke, H. Clarke, S. T. Clayton, C. F. Cleaver, W. A. Coates, C. M. Cock, D. Cockburn, C. S. Cocks, K. Cole, F. H. Colebrook, A. F. Collins, Colonel F. R. Collins, Messrs. W. J. Collins, J. N. Compton, A. E. Cook, J. Cook, K. J. Cook, N. H. Cook, B. W. C. Cooke, D. F. Cooper, J. Cooper, J. R. Cooper, R. S. Cooper, S. E. Coppen, A. G. Corrie, P. Corrie, C. G. Copeswerth, H. P. R. Coveney, E. S. Cox, M. A. Crane, Lt.-General Sir Kenneth Crawford, Messrs. R. P. Critchley, J. Crook, Brigadier W. H. Crosland, Messrs. H. W. Crosthwait, J. E. Currie, J. B. Curry.

Messrs. A. C. C. Damant, H. M. Dannatt, A. S. Davidson, H. Davies, J. R. Davy, A. L. B. Dawson, D. Dawson, A. J. Day, L. Day, L. T. Day, H. E. Dean, C. E. Dee, V. E. Dittrich, W. H. Dixon, F. J. Doggett, J. P. A. Drewry, V. Drewry, R. G. Duncan, A. G. Dunn, F. L. Dunster, D. C. Dyball, J. Dykes-Hutchinson, E. R. Edwards, H. N. Edwards, R. G. Egalton, Lief Egeland, High Commissioner for South Africa, J. Elliot, F. Ellis, Colonel G. E. Embleton, Messrs. H. O. Ernst, H. B. Everard.

Messrs. C. N. Fairchild, W. Farington, W. Featherstone, S. Field, A. Fielding, W. F. Fisher, A. Fitzjohn, A. P. Fitzjohn, L. Flatt, R. E. Fordham, I. C. Forsyth, A. Fossey, H. C. Foster, F. C. Fox, W. Stuart Fraser, Brigadier S. G. Galpin, Messrs. C. A. Gammon, C. V. Garvey, J. Gatto, H. F. S. Gedge, A. J. Gibson, J. L. Gilbert, I.Gillett, T. Gillett, J. Gillieaux, A. S. Gillitt, A. Gloster, G. T. Godfrey, G. E. C. Godfrey, G. C. Gold, J. G. Gold, K. M. Goodenough, High Commissioner for Southern Rhodesia, A. P. Goodman, W. S. Graff-Baker, K. W. C. Grand, R. Grant, R. T. Gray, E. W. Greaves, H. Green, H. M. K. Greenwood, I. Greenwood, S. R. Gresham, R. Gresley, W. Grillith, J. R. Grimsdell, G. Grubb, D. E. Gudgin.

Messrs. N. Haddon, D. W. Hadfield, J. Hadfield, R. E. Hagley, T. O. M. Halliday, R. F. Hanks, J. Hannah, L. Hansen, E. W. Hanslip, F. D. M. Harding, L. W. Harding, Major H. A. Harrison, Messrs. J. F. Harrison, R. C. Harrower, G. T. Hart, R. J. Harvey, C. A. F. Hastilow, M. S. Hatchell, C. G. Hatherly, H. J. Hegarty, Captain B. T. Heimple, Messrs. A. Henderson, N. Henderson, J. L. Hewitt, F. A. Hewson, P. R. Hickman, A. Himsley, A. E. Hoare, H. W. Hobbs, R. A. Hobdey, G. B. Hodges, R. B. Hoff, R. G. Hogben, S. Hogg, H. Holcroft, H. H. Holloway, F. J. Hookham, A. G. Hopking, C. P. Hopkins, W. Hopkinson, T. Hornbuckle, W. G. Hornett, W. C. Hoskins, C. Howe, Colonel W. H. Howlett, Messrs. E. P. Hubbard, J. A. Hudson, H. J. Hulme, I. P. Hunter, J. S. Hunter.

Messrs. A. C. Ilston, E. Ingoldby, J. W. Innes, G. C. Jackson, Sir Claude James, Messrs. C. E. James, G. E. R. Jarman, A. E. Jefferd, F. H. Jefferd, F. E. Jobson, H. A. Johnson, N. Johnson, W. H. Johnson, J. J. Johnston, E. L. Jones, T. H. B. Jones, W. G. Kefford, J. G. Keith-Hutchens, W. L. Kelly, W. Kelway-Bamber, E. Kent, A. Kenyon, H. G. Kerry, G. Kettlewell, G. Key, R. D. Kimberley, A. S. King, R. I. Kirkland, A. J. D. Kitson, L. Kitson, W. Kitson, W. S. Knight, Chang Peng Kuen.

Messrs. D. R. Lamb, A. Lamm, K. G. Lampson, E. J. Lane, Brigadier C. A. Langley, Messrs. W. H. Lawrence, C. Lawrie, W. Lawrie, E. Lawton, H. Lawton, L. J. Le Clair, L. Ledger, R. H. Lee, K. H. Leech, G. A. B. Leishman, J. D. Lewis, M. Lewis, A. B. Lloyd, F. Lord, S. Lord, W. D. Lorimer, E. D. Lottin, L. Lynes, W. H. Maas, N. Macaulay, T. D. Macintosh, Colonel F. H. Maclennan, Mr. J. P. Maitland Brigadier-General Sir Osborne Mance, Messrs. A. W. Manser, P. L. Mardis, R. E. Marks, I. A. Marriott, G. C. Marsh, S. W. Marsh, K. C. T. Marshall, V. M. Marshall, M. Marteau, E. W. Marten, O. Martin, P. J. Martin, F. Mason, J. Maudslay, C. Maunsell, F. G. Maxwell, R. E. G. Mayhew, C. R. Mayo, W. F. McDermid, J. McGuigan, D. S. McInery, A. B. McLeod, G. A. R. Mead, H. Melhuish, F. O. Mellors, J. P. Metcalfe, R. Metcalfe, P. Middlemas, G. W. Millar, H Millar, E. I. Milne, W. Mitchell, W. J. Mitchelhill, Lord Monkswell, Messrs. E. R. M. Montague, W. J. Moodie, E. S. Moore, F. H. Morley, E. J. Morris, J. D. Morton, W. H. Morton, R. H. Mousley, S. Muncey, S. Murray-White.

Messrs. O. Naylor, R. Needham, G. H. Negus, R. E. Nelson, S. Newman, N. Newsome, Dr. H. J. Nichols, Messrs. J. C. Nisbet, J. H. R. Nixon, O. S. Nock, G. W. Norris, L. B. Norrish, R. Norton, East African Commissioner, R. S. Nosworthy, W. R. Oaten, T. W. Otway, S. B. Palmer, C. R. Parker, G. C. R. Parker, C. E. Parkes, J. D. Parkes, S. E. Parkhouse, C. R. Pasley, J. J. C. Paterson, G. H. Paulin, K. R. Pearson, W. N. Pellow, A. T. Penman, R. E. Pennoyer, B. P. Percival, R. A. Phillips, Lt.-Colonel E. A. Phillipson, Messrs. J. Pierce, T. M. R. Pinkney, D. C. Plyer, E. Pollard, S Potter, T. Potter, F. A. G. Powell-Jones, F. Pratt, J. B. Preston, W. H. Probets, E. Pugson.

Dr. H. Queiroz, Charge d'Affaires, Portuguese Embassy, Messrs. H. Quijano Alio, J. A. Rae-Smith, H. W. Ralph, B. D. Rampala, G. H. Ramsden, K. B. Rao, Captain A. C. Rawles, Messrs. A. Raworth, W. E. A. Redfearn, E. B. Rees, C. W. Richmond, R. A. Riddles, J. W. Rimmer, J. L. Riordan, A. Rizk, F. W. Roberts, A. R. Robertson, E. A. Robinson, M. D. Robinson, L. G. B. Rock, J. D. Rogers, G. Rollason, G. A. Rowlerson, W. F. Rowlinson, Lt.-Colonel H. Rudgard, Messrs. C. F. Ryan.

Messrs. A. C. E. Sandberg, J. S. Schofield, F. Secole, E. W. Selby, J. E. Sheldon, C. A. Shepherd, G. T. Shoosmith, L. H. Short, M. W. Shorter, L. Sibbitt, C. N. Silvester, G. E. Simmonds, A. W. Simmons, E. N. Simmons, G. S Simmons, A. J. Simpson, C. R. H. Simpson, F. W. Sinclair, G. F. Sinclair, D. Skurray, R. A. Smeddle, C. Smith, C. L. Smith, F. W. J. Smith, G. Smith, H. Somerville Smith, John Smith, J. M. Smith, J. W. Smith, R. T. Smith, S. G. Smith, W. Gilmour Smith, W. A. Smith, A. H. Sommer, A. K. Southern, J. E. Spear, B. Spencer, J. C. Spencer, Sir W. A. Stanier, Messrs. R. D. Steele, G. J. Steer, F. W. Still, D. Strahan, D. T. Strain, W. E. G. Swayne, H. H. Swift, H. W. Swinnerton, P. Sykes, Major-General G. S. Szlumper.

Messrs. A. F. Tabraham, H. Taylor, J. B. G. Taylor, S. Taylor, E. W. Taylerson, J. W. Terry, F. Theakston, Mr. Thom, Messrs. G Thomas, W. J. Thomas, L. Thompson, H. D. Thoms, H. Thorp, W. G. Tilling, A. G. Tindill, Colonel W. L. Topham, Messrs. J. C. L. Train, C. L. Trask, W. G. Trett, V. A. Trier, E. M. Turnbull, A. E. Turner, F. Turner, H. L. Turner, T. H. Turner, W. Underhill, G. Urwin, A. B. B. Valentine, Lt.-Colonel C. E. Vaughan, Messrs. G. Vaughan, J. W. Vaughan, W. Venner, J. F. B Vidal, Captain H. Vivian.

Messrs. C. C. Waddington, C. C. H. Wade, W. J. Wakley, J. R. Walton, S. B. Warder, M. Warlow, W. Watson, W. L. Watson, W. E. G. Weddell, M. Weiss, E. D. Wells, G. M. Wells, E. H. Westoby, W. W. Weston, F. S. Whalley, F. M. G. Wheeler, H. A. A. White, H. D. White, S. I. White, W. H. White, W. E. Whitehouse, R. H. Whitelegg, I. Whittingham, R. A. Wijeyekoon, A. V. Wilkin, S. T. Willcox, W. Cyril Williams, President, H. Wilmot, A. G. Wilson, Colonel G. R. S. Wilson, Major W G. Wilson, Messrs. A. J. L. Winchester, J. P. Winder, J. Witt, G. F. Wix, M. Wong, D. C. Woodman, J. B. Woodman, D. C. Woodward, C. Wordsworth, A. R. Wright, H. E. Wright, H. Wyatt, G. Wynne-Davies.

PARKHILL STATION TO BE CLOSED.—As from Monday, April 3, Parkhill Station, Scottish Region, will be closed to passenger-train traffic, and to goods-train traffic in less than truck loads. Passengers for Parkhill will be booked to Dyce, from which place a bus service is available.

Electric Traction Convention

On Monday last, after the opening of the Convention on Electric Railway Traction, referred to elsewhere in this issue, the Council of the Institution of Electrical Engineers held a dinner at the Waldorf Hotel, London, W.C.2. The President, Professor E. B. Moullin, was in the Chair, and among those who attended were:—

Messrs. R. I. D. Arthurton, H. S. Aspinall, —. Barber, H. H. C. Barton, J. R. Beard, F. Beasant, W. Bibby, H. Bishop, C. L. Blackburn, N. A. Bogtstra, C. O. Boyse, Dr. L. G. Brazier, Messrs. H. R. Broadbent, H. M. Browne, F. E. Butler, J. E. Calverley, A. Campbell, R. C Chapman, W. N. C. Clinch, R. H. Coates, N. H. Codling, M. E. Constant, A. E. Cook, B. W. C. Cooke, E. S. Cox, C A. Craig, O. J. Crompton, R. Dell, E. J. Derijckere, A. T. Dover, J. L. Eve, W. O. Fenwick, G. H. Fletcher, H. W. Fogtmann, E. Gallizia, M. Garreau, J. Gastine, H. Giesbers, P. Good, Dr. P. Goudal, Professor J. Grieg, Messrs. J. W. Grieve, H. J. Guthrie, T. G. N. Haldane, F. A. Harper, F. C. Harris, R. J. Harvey, W. G. Hawley, A. A. Heath, H. Hilfiker, W. Hili, E. T. Hippisley, E. v.d. Hoek, J. Holland, W. Holttum.

Sir Cyril Hurcomb, Messrs. W. G. Jowett, J. Kater, F. B. Kitchen, J. W. Leach, Colonel B. H. Leeson, Messrs. F. A. Manley, A. W. Manser, P. L. Mardis, D. McKenna, S. W. Melsom, Dr. J. L. Miller, Messrs. A. W. Montgomery, J. Musyck, E. L. Norgren, H. Parodi, T. S. Pick, R. A. Riddles, F. B. Roberts, G. Ruhlmann, Professor M. Semenza, Messrs. T. R Scott, L. H. Short, F W. Sinclair, F. Jervis Smith, H. V. Steele, H. H. Swift, W. J. A. Sykes Th. Thelander, W. G. Thompson, E. C. B. Thornton, J. C. L. Train, R. Varley, G. Wansbrough, S. B. Warder, W. J. Webb, E. L. E. Wheatcroft, F. Whyman, L. C. Woodhouse, R. T. B. Wynn, and H. T. Young.

Mr. C. M. Cock, Chief Electrical Engineer, Railway Executive, at the conclusion of the dinner invited overseas visitors and members attending the Convention to be present on the next day at an inspection of the Shenfield electrification works. He also announced that on Wednesday there would be an exhibition of electric rolling stock and locomotives at Waterloo Station.

Mr. W. S. Graff-Baker, Chief Mechanical Engineer (Railways), London Transport Executive, extended a similar invitation to visit Acton Works on Thursday last.

G. D. PETERS & COMPANY.—The final dividend of G. D. Peters & Co. Ltd. for 1949 is 7½ per cent., plus a bonus of 2½ per cent.; this makes a total distribution for the year on the ordinary stock of 17½ per cent., as for 1948. The net profit before taxation was £228,659 as compared with £219,670 for last year.

ALUMINIUM BRIDGE CONTRACT.—The firm of Head Wrightson & Co. Ltd. announces that its subsidiary company, Head Wrightson Aldean Limited, has been awarded a contract for an aluminium opening bridge of the bascule type at Victoria Dock, Aberdeen Harbour. The reduced weight of this bridge will enable considerable savings to be made in the cost of adapting the existing dock wall. The clear opening is 70 ft. and the bridge will carry two lines of road traffic or one line of road traffic and one line of rail traffic. This second aluminium alloy bascule bridge follows the success of the first bridge, which it slightly exceeds in size, built by Head Wrightson & Co. Ltd. in 1948 at Hendon Junction Dock, Sunderland. Work on the bridge, costing about £88,000, will begin at once, and is expected to be completed in about two years.

Parliamentary Notes

Lords and Commons Debate Transport

Members of both Houses express concern at mounting financial losses of British Transport Commission

On March 15 the House of Commons, sitting as a Committee of Supply, debated transport problems.

Mr. Peter Thorneycroft (Monmouth—C.) raised the question of the losses which the British Transport Commission was incurring. In 1948, he said, the Transport Commission had lost £4¼ million, and that was on a system of accounting which was not the most unfavourable towards the Transport Commission. In 1949, the estimated loss was £20 million, and in 1950, £30 million. The nationalised transport industry at the moment was running at a loss of half a million pounds of public money a week. He suggested that there was no increase in wages nor in cost of materials which could account for that savage upward spiral of losses.

In April, 1949, the Railway Executive had announced it was going to put up the passenger-train mileage by 300,000 miles a week, and was going to run 183 more trains every weekday and 349 more every Saturday, cross-country expresses, non-stop runs, and buffet cars. Between June and September the increase in train-mileage had been 1,200,000 for every four-weekly period, but, despite that, in not one single four-weekly period had the gross receipts come up even to the 1948 level. It was his firm belief that British Railways, on the passenger side, had priced themselves out of the market. People could not afford the present fares.

Increased Regional Responsibility

He did not believe the solution was to be found in London, but in the railway Regions. He did not believe the Transport Commission nor the Railway Executive knew what sections of their lines or services were running at a profit or at a loss. Certainly, it was impossible to find out from the railway accounts. The only way in which the railways could be made profitable was to de-centralise responsibility for their administration and place it fairly and squarely on the shoulders of the chief regional officers. They ought to be sent for now, asked what were their proposals for making their Regions profitable, and given the maximum freedom for putting that policy into effect.

Members who had been in the House during the previous session, and certainly every Member who had participated in the General Election of 1945, would recollect the claims made by the Socialist party about the benefits of "an integrated and co-ordinated system of inland transport." The principal weapon of integration was to be a charges scheme common to road and rail. In the Transport Act a period of two years was laid down within which to produce the charges scheme. No charges scheme had been forthcoming, and eventually the Minister had extended the period for a further two years. Now, at long last, they had not a charges scheme, but a document called the "Draft Outline of Principles Proposed to be Embodied in a Charges Scheme for Merchandise Traffic."

He contended that that document was no help in the problems about which he had been talking so far. Mr. Wilson, the Comptroller of the Transport Commission, giving evidence before the Transport Tribunal the other day, had been asked when they would get benefits from the integration, and had put it at approximately ten years from the time the Commission had been set up. In 1945 there had been no mention that the public would have to wait ten years for the benefits of the integrated and co-ordinated system of inland transport.

In the new document is was stated: "There now arises the question of what is needed to co-ordinate the charging arrangements of the three services. . . . The best practical foundation for achieving these ends is to provide a classification . . . which, as far as possible, shall be common to all three services. The charges of the respective forms of transport may, however, differ, but should be so framed as to encourage traffic towards the service which can convey it most conveniently and economically." He, however, asked who was to judge which service could carry goods most economically and effectively? The proposals cut across everything that they on his side of the House had ever stood for in transport policy. Their policy was that each form of transport be encouraged to give the best and cheapest service of which it was capable.

If the proposal for putting up railway rates 16⅔ per cent. were put into effect the first step necessary would be to put up road rates by at least 16⅔ per cent., otherwise it would cut across any form of co-ordination. To grant the application would be to give a sharp twist to the vicious upward spiral of increasing costs in the country.

Then an application had been made for a London Area Passenger Charges Scheme, the effect of which would be to raise another £3,500,000 out of the travelling public in London. It was stated that: "The scheme is designed to secure a large measure of assimilation of Railway Executive and London Transport Executive charges by applying to both, as far as practicable, a new standard scale based generally on a rate of 1·25d. per mile." Was that what they were doing? If so, why apply to put up to 3d. the 2½d. bus fare, which was based on exactly 1¼d. per mile? Everyone knew that the 2½d. bus fare was a gold mine in the London passenger transport world; and this was a deliberate attempt to raise another £3,500,000 out of the passengers to help in some small way towards paying the losses which the nationalised railways were incurring.

Present Position of Railways

Mr. Alfred Barnes (Minister of Transport) said that as a House of Commons they could not avoid responsibility for the fact that up to the beginning of the present century the railways had practically had a monopoly of traffic. The coming of the road vehicle, however, had begun to change that. Just before the outbreak of the second world war the Transport Advisory Committee had drawn attention to the grave financial position of the railways. The nation had used them to the full to prosecute the war, and not only had the receipts enabled the Government to pay the agreed rent of £43,500,000, but over the whole period there had been a surplus over and above that sum amounting to something like £190 million. He submitted that since the Government of the day, which had been predominantly Conservative, had been aware of the pre-war position, it would have been sensible to have made from that surplus some provision to cushion the effect on the railways of the post-war conditions they were bound to face. Mr. Barnes emphasised that one had to consider the livelihood of over 600,000 persons employed on the railways. The position was aggravated by arrears of maintenance and high costs.

Immediately the great abnormal traffic channelled through the railways during the war had ceased, the weight of the increased prices, which had been rising throughout the whole commodity market, fell with added severity on railway receipts. The net effect which had to be faced by the Transport Commission was that its overall average level of expenses had increased by 120 per cent. over 1939. During the war and until 1946 the only increase made in railway freights and fares had been of 16⅔ per cent. There had been two subsequent increases in freights and passenger fares, first of 33⅓ per cent. in 1946, and then later on of 55 per cent. Even with increased charges of 55 per cent. the average overall level of costs which the railway management had to meet was 120 per cent. above 1939.

Repercussions of Rate Increases

There was no other industry, public or private, which, when its expenses were increased like that, did not automatically increase its charges. The Transport Commission was the only business administration in this country which, when it wished to adjust its charges to its expenses, had to go through a special procedure. When the Transport Tribunal had considered the recent application for an increase of 16⅔ per cent. in freight charges, all the main trading and industrial bodies in the country had had an opportunity of putting their cases. The Government was considering the repercussions of such an increase before any final decision was made.

Referring to the comments on the London charges scheme and on the procedure of the charges scheme generally, Mr. Barnes said it was impossible to carry through the process of integration to any substantial extent, and to secure the economies they believed could be secured by the Transport Act, until charges schemes were in operation. The Transport Commission had reached the stage when it was about to put the first charges scheme into operation, and that scheme applied to London. The whole purpose of the charges scheme was to iron out and remove anomalies, and he did not wish to evade the issue that, by that process, the B.T.C. ought to be able to pay its way. He pointed out that the main-line railways operated a considerable number of suburban services in the London area. London Transport was responsible for the road, and for the tube and Underground, services.

They could not integrate services, nor secure the economies which would eventually arise from such integration, until first they got the resources. Considerable economies had emerged from the amalgamation of the four main-line railway com-

panies. It was regrettable that those economies had not been disclosed and made apparent to the community, owing to the fact that as they had accrued they had been absorbed by the rising expenditure.

He emphasised that if they took the £6,750,000 lost in 1948, the £20 million deficiency of 1949, and the estimated deficiency of £30 million in 1950, they would see that the proposed increase of 16⅔ per cent. was largely for the purpose of paying the interest to the railway stockholders. It was a legitimate charge, but they should bear in mind that those sums did not represent the normal running expenses of the railways, nor even wages, but were largely necessary to meet the interest payments on the compensation stock. The alternative was that the taxpayer should meet those charges which were guaranteed under the Transport Act.

Taking Over of Road Vehicles

The Transport Act had rightly caused the taking over of long-distance road goods vehicles, with payment of proper compensation, for the purpose of integrating the road and rail systems. In eighteen months the vehicles, plants and so on of over 2,000 road haulage undertakings had been absorbed by the Road Haulage Executive. While that process of taking over was in operation, the process of integration could not be carried out in its most thorough sense, but they were now reaching that stage, because the process would be completed by April this year.

Mr. Percy Morris (Swansea West—Lab.) reminded Members that the charges the industry had to bear were considerable, including an increase of something like 80 per cent. in respect of steel, 174 per cent. for coal and more than 600 per cent. for certain kinds of oil, canvas and timber. The railway section of the transport industry had to earn £24 million per annum to pay the interest on the stock. If it was not allowed to earn the money in a legitimate way then the £24 million must be borne by the general exchequer. Unless the railway industry was given a reasonable opportunity to impose charges which could be justified on a mathematical and even on a business, basis, there must be a subsidy from some other source.

Mr. Geoffrey Wilson (Truro—C.), who was for 19 years an Assistant Solicitor with the Great Western Railway and for one year with British Railways, said that under nationalisation there were too many changes for change's sake. He urged that they should seek to close the gap which unfortunately existed between the British Transport Commission and the Railway Executive and the even greater one between the Executive and the Regions.

Mr. C. C. Poole (Birmingham, Perry Bar—Lab.) said they could never have a co-ordinated and integrated transport system and, at the same time, 700,000 vehicles running about the country under "C" licences.

Sir David Maxwell Fyfe (Liverpool, West Derby—C.) said that the Minister had put forward the rising cost of materials as an explanation of an increase of losses from £5 million to £30 million—and he thought they would want a lot of convincing on that point. If it went on in anything like the same way they would reach £100 million by 1952. The 16⅔ per cent. rise would relieve the position only for this year.

He believed that having the Railway Executive constituted on a functional basis, with the functional Members looking over the heads of the Chief Regional Officers to the functional officers inside the Regions, represented a bad and inefficient method of organisation. If they gave greater power and responsibility to the Chief Regional Officers, and made the central body one of representatives from the Regions, with an independent chairman, kept it a policy-making body, and allowed the regional officers to operate as commercial undertakings, they would get a great improvement.

Referring to the London scheme, Sir David said that anomalies and historical variations were no justification for Londoners paying £3½ million towards the Commission's revenue, if their fares were going to be so much dearer than those of provincial buses, which were governed by the Traffic Commissioners.

Mr. Alfred Barnes, in his final reply, first dealt with railway staffs and costs. The introduction of the 44-hour week, holidays with pay, and the fact that, in 1948, the Transport Commission had spent approximately £20 million in endeavouring to overtake arrears of maintenance were three factors to be taken into account. The industry could not spend £20 million in that direction without a considerable increase in the labour force. At a conservative estimate, those factors alone would possibly account for a labour figure of at least 50,000; yet between December, 1948, and December, 1949, the Commission had reduced railway staffs by 24,000.

He would not comment on the London Charges Scheme, because it must come before the Transport Tribunal. Nevertheless, one had only to glance at that proposal to be able to dispose of the argument that it did not represent any decrease in railway charges. The fares operating on the suburban lines of the main-line railways would enjoy a reduction if that scheme went through. When Members alleged that it represented an increase of £3½ million on the fares of London passengers, he said it was too early to state that as a fact.

Mr. Barnes thought Members were taking too gloomy a view of the railways' future. On the Shenfield line, electrification had recently been completed, and passenger receipts had increased by more than 40 per cent. in a short time. The problem before the Commission, when restrictions of capital investment and other economic difficulties were out of the way, was to modernise the railway system. Suggestions for mere decentralisation of administration would in no way touch a deficiency of that kind.

HOUSE OF LORDS DEBATE

Lord Teynham in the House of Lords on March 15 called attention to the policy of the British Transport Commission. He asked if the Minister of Transport really believed that when the finances of road and rail services had been pooled everything in the railways' garden would be lovely? The reports and accounts for 1948 showed that only 3 per cent. of the total receipts represented road haulage activities. It was true that the take-over of road haulage units had not been completed, but he understood that even for 1949 the road haulage proportion of receipts was only about 5 per cent.

Lord Rochdale asked what was regarded as the future pattern of our transport system? Was a system visualised which would be reduced substantially to no more than a relatively—he used the word "relatively" advisedly—small number of long-distance strategic railway arteries, off which all further distribution would be by road? He was not necessarily suggesting that arrangement, but one could in theory see many advantages—a possible reduction in overheads, and a reduction in road-rail competition, because by that arrangement the railway would have the best chance of competing on terms favourable to itself.

Viscount Long pointed out that for many years road and rail had been endeavouring to come to an agreement, and had their conferences gone on there was not a shadow of doubt that they would have come to that agreement. Yet, so far as he was aware, a year and a half after the Act had been passed, the matter was still under discussion, with no rate structure produced.

Lord Hawke maintained that the rail position should be examined so as to cut out as much as possible of the facilities now being offered for traffic which could really much better go by the road. It should be possible to close down a large number of stations except for the purposes of signalling points and picking-up points for passengers to be carried in railcars to the nearest junctions, with their tickets sold and collected on the railcars. He thought also that the railways were paying far too much for the type of coal they were receiving; if they were enabled to get the coal they wanted they could save several million pounds a year.

Lord Sempill referred to the Lemon Report on the standardisation of engineering products, in appendix II of which, he said, there were some pointed references to the railway system. If there was not a complete plan already available for the rationalisation of the entire system, would it not be useful to invite the committee concerned to sit again and expand its recommendations? The Chairman, Sir Ernest Lemon, was technically and practically a man with vast experience of the railways of this and other countries.

Parliamentary Secretary's Reply

Lord Lucas of Chilworth (Parliamentary Secretary, Ministry of Transport) said that 1949 had been a year of considerable progress, in spite of grave difficulties, including the restriction on capital investment; expenditure on new works and improvements on the railways and London Transport, excluding buses and expenditure on running repairs and maintenance of permanent ways, had only been £65,000,000 in 1948, and £70,000,000 in 1949, and the provision for 1950 was approximately only 10 per cent. more. He wished to give a few figures to illustrate the seriousness of the matter. That of 400 new locomotives represented the bare minimum necessary to keep the stock in sound condition; the present stock was 19,875, and experience showed than an annual replacement of a little over 2 per cent. was required; the average replacement life had had to be extended from 33½ to 40 years. Passenger carriage stock of over 40,000 vehicles included more than 8,000 carriages over 35 years old, and the wagon position was even more serious, owing largely to the poor state of the ex-privately owned wagon fleet. Operating stock of wagons had fallen from 1,218,136 on January 1, 1948, to 1,109,802 at the present time, in spite of the continued uneconomic repair of old wagons.

He wished to mention the amalgamation of the police forces of the various railways, and what was being done to deal with the terrible problem of pilferage, which had received the urgent attention of the Railway Executive. In the three months ended September 30, 1948,

£928,489 had been paid against claims for losses; in the equivalent period in 1949, £607,626 had been paid—a reduction of 35 per cent. By the end of September, 1949, 1,029 security schemes were in operation for the protection of "vulnerable traffics," which was a polite term for black market goods; in that limited field payments for the period he mentioned were £87,286, the lowest figure yet recorded, and 58 per cent. below the 1948 figure. He thought that a remarkable achievement, reflecting the greatest credit on the reorganisation of the railway police forces and the security measures they had taken.

Noble Lords had argued from the other side of the House, and he had argued from his side that the yardstick of efficiency was cost and price. He was not disposed to argue that it was not, but if railway freight rates were measured by that yardstick they were one of the cheapest, if not the cheapest, commodity in the country today. The iron and steel industry, held up by many as the acme of efficiency of private industry, was charging the railways 105 per cent. more for their steel than before the war, and yet the railway freight rates had only been increased 55 per cent.

He did not intend to gloss over the very serious repercussions which the increase now asked for would have on the country's economy, but there were two points which he thought had to be considered. The first was: How long could the Commission be denied the right of fulfilling its statutory obligations, and for how long and by how much could we allow the deficit to grow? The second was: If the Commission was right in its forecast that an integrated charges scheme could not be formulated until 1952, what would be the effect on such a charges scheme of a deficit which might have amounted by then to £100,000,000?

Staff & Labour Matters

N.U.R. Wage Claim

The executive committee of the N.U.R. decided on March 17 to refer the claim for a £5 weekly minimum wage to the Railway Staff National Council. The A.S.L.E.F. and R.C.A. do not support the claim, and if they oppose the N.U.R. case, the claim can be referred to the Railway Staff National Tribunal. Regarding its previous claim for a 10s. a week increase, the N.U.R. refused to appeal to the Tribunal, alleging that the scales were weighted against it, but appealed to the Minister of Labour, who eventually decided to set up the Board of Conciliation.

Piecework Rate Dispute

The railway shopmen at Doncaster Works and elsewhere who have been refusing to do piecework, as recorded in our March 3 issue, have resumed normal working, after discussions through the medium of the Railway Shopmen's National Council.

B.T.C. Police Claim

A claim for improved pay and conditions of service on behalf of the staff of the B.T.C. police forces, on which the parties had failed to reach agreement, was heard on March 21 and 22, before Mr. G. C. Honeyman, who has been appointed by the Minister of Labour as Independent Chairman of an *ad hoc* committee of both parties. The Police Force Conference provided for in the Transport Act, 1947, has not been established.

Notes and News

Vacancy on National Coal Board.—Applications are invited for the post of Assistant Divisional Transport Officer in the East Midlands Division, Marketing Department, of the National Coal Board. See Official Notices on page 351.

Electric Locomotives for Victoria.—In a news paragraph in our issue of March 17, on page 317, there was a reference to an order placed with the English Electric Co. Ltd. by the Victorian Railways for seventeen 2,400-h.p. mixed-traffic electric locomotives. An incorrect heading to the paragraph implied that the order had been placed with another firm.

G.W.R. (London) Dramatic Society.—On Friday and Saturday, March 31 and April 1, at 7.15 p.m., the Great Western Railway (London) Dramatic Society will present William Douglas Home's play "The Chiltern Hundreds," at the Park Theatre, Hanwell. The cast is drawn from the railway clerical staff at Paddington and includes Alexander Griffiths and Vera Holloway as Lord and Lady Lister, Joane Wood as June Farrel, Audrey Davies as Lady Caroline, Leslie Davies as Mr. Cleghorn, and Marian Smith, making her *début* on the amateur stage, as Bessie, the maid. Percy Grumbridge is the producer.

Irish Transport Bill.—As recorded last week, the Irish Transport Bill passed the report stage on March 8. Mr. Morrissey, Minister for Industry & Commerce, dealt with the Bill in the Senate on March 15, and said that C.I.E. was being given a new lease of life. Their aim would be to provide the highest degree of service at the lowest charges compatible with meeting costs. A number of duplicated services would be eliminated and there were good prospects of developing tourist services. During the transitional period, especially in regard to the future of the cross-border companies, they could not foresee all contingencies and for that reason the Board was to be granted additional powers. The debate was adjourned.

Western Region Easter Train Arrangements.—Plans for over 323 special relief trains for Easter holiday travellers between Wednesday, April 5, and Tuesday, April 11, have been made by the Western Region. It is anticipated that travel will reach its peak on Thursday, April 6, when the usual weekday service will be augmented by forty-eight special trains from Paddington. On Good Friday, Sunday services will be operated with some alterations and cancellations and the addition of sixteen relief trains from Paddington. Weekday services will operate with some alterations to local and business trains on Saturday, April 8, and there will be Sunday services with some alterations on Easter Sunday. Sixty-two relief trains have been arranged, including thirty-seven to Paddington on Easter Monday and services into Paddington will be augmented by twenty-six relief expresses on Tuesday, April 11.

Helicopter Air Service Between Liverpool and Cardiff.—In a recent announcement to the Welsh Advisory Council, Mr. Peter Masefield, Chief Executive Officer to British European Airways, said that a passenger helicopter air service will be opened between Cardiff and Liverpool on June 1. A North to South Wales air service, which was started in the summer of 1949 was discontinued in the autumn because of operational difficulties. Mr. Masefield said the helicopters will carry three passengers; the single fares will be: Cardiff-Liverpool, £3 10s., return £5 10s.; Cardiff-Wrexham, £3, return £5; Wrexham-Liverpool, 15s., return £1. For the first month the run will be direct from Cardiff to Liverpool and *vice versa*, but afterwards the planes will stop at Wrexham on request. The helicopters will leave Cardiff at 9.15 a.m. and 5.30 p.m. each day, the journey taking one and three-quarter hr., and those from Liverpool will leave at 10.45 a.m. and 5.45 p.m.

Canadian Pacific Railway Company.—The sixty-ninth annual general meeting of the shareholders, for the election of directors to take the places of the retiring directors and for the transaction of business generally will be held on May 3 at Montreal. The ordinary stock transfer books will be closed in Montreal, Toronto, New York, and London at 3 p.m. on April 11, and the preference stock books will be closed in London at the same time.

B.T.-H. Diesel-Electric Order for New South Wales.—The British Thomson-Houston Co. Ltd., Rugby, has received an order for ten diesel-electric shunting locomotives from the Department of Railways, New South Wales. The mechanical parts will be built by the Metropolitan-Cammell Carriage & Wagon Co. Ltd. Each locomotive will have two Davey Paxman 500-h.p. engines, each coupled to a B.T.-H. generator, and the complete electrical equipment will be manufactured by the British Thomson-Houston Co. Ltd.

Red & White United Transport Limited.—The directors of Red & White United Transport Limited agreed to distribute £1,788,213 from capital profits on a sale of shares. The bonus takes the form of an allotment to ordinary shareholders of British Transport 3 per cent. guaranteed stock 1968-73 on the basis of £100 nominal of this stock for each £94 7s. 6d. of bonus. The meeting was held on March 14. A further meeting to-day (March 24) is considering amendments to the Articles of Association to provide that the 5½ per cent. £1 redeemable preference shares may be redeemed at 23s. per share at any time on not less than three months' notice.

British Railways Cheap Tours of Scotland.—This summer British Railways are offering all-in seven-day tours of Scotland, at special cheap rates, from towns in Lancashire, Yorkshire, and Tees-side. There will be two special restaurant car trains every Saturday from June 10 to September 9, from Manchester, Sheffield, Darlington, Leeds, and the surrounding districts. The all-in cost, which includes rail fare, meals on trains, gratuities, accommodation, steamer trips, and sightseeing tours, will be £16 or less for an entire week. There will be reduced fares for children. These tours have been arranged in conjunction with the Creative Tourists Agents Conference.

Alterations to British Railways Vessel.—The Railway Executive has placed a contract with Harland & Wolff Limited, Belfast, for alterations to the ss. *Duke of York*, which was built in 1935 for the Heysham-Belfast service of the former L.M.S.R. and is now operating on the Harwich to Hook-of-Holland route, for which the provision of additional cabin accommodation is necessary. The number of berths will be increased from 335 to about 521 mainly by utilising space no longer required for cargo. Improvements will also be carried out to the public rooms as well as to the accommodation occupied

OFFICIAL NOTICES

National Coal Board—East Midlands Division

MARKETING DEPARTMENT

APPLICATIONS are invited for the post of Assistant Divisional Transport Officer in this Division. Applicants should have experience in Transport Organisation, including the handling of bulk traffic by rail. The salary will be within the region of £750–£950 per annum and the starting point will be dependent on qualifications and experience. Applications giving full particulars (in chronological order) of age, educational qualifications and experience (with dates) should be addressed to:—THE SECRETARY, NATIONAL COAL BOARD, East Midlands Division, Sherwood Lodge, Arnold, Nr. Nottingham.

DRAUGHTSMAN, with knowledge of Rolling Stock, required for firm in North Midlands.—Reply to Box 656, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

THE RAILWAY HANDBOOK provides the railway student with a collection of useful statistics and information relating to the railways of Great Britain and Ireland. In addition, in matters of international interest such as speed and electrification progress, the book extends its scope to cover the whole world in order to present a complete picture of these increasingly-important developments. 120 pp. Dy. 8vo. Paper covers. Price 5s. By post 5s. 3d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

RAILWAY MAINTENANCE PROBLEMS. By H. A. Hull (late District Engineer, L.M.S.R.). Valuable information. With much sound advice upon the upkeep of permanent way. Cloth. 8½ in. by 5½ in. 82 pp. Diagrams. 5s. By post 5s. 3d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

STANDARD MILITARY RAILWAY BRIDGES. By F. S. Bond. A description of the different types of bridges designed for rapid erection in the field by the Allied Forces, and of the various methods employed in such erection. 28 pages. 9 in. by 12 in. fully illustrated. Paper cover, 5s. By post 5s. 2d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

by officers and crews. The opportunity will also be taken of converting the ship from coal to oil burning and of altering her general appearance by the substitution of one funnel for two. Work will start after the end of the summer season and is expected to be completed in about six months.

Formation of Portsmouth Group, Institute of Transport.—The Council of the Institute of Transport has given approval to the formation of a Portsmouth Group of the Institute, attached to the Southern Section. The new Group has developed from the informal Portsmouth Discussion Group which, for a number of years, has held full programmes of meetings and visits.

Simplified Admission of Tourist Motor-cars.—A reduction is announced by the Ministry of Transport in the documents and formalities required from tourists bringing their cars to the United Kingdom. At the suggestion of a working party set up by the Board of Trade to consider tourist facilities, a single combined form, RF.24, will, as from April 1, replace the documents (car licence, petrol coupons, and so on) now required, and will reduce the number of items to be filled in.

Institute of Transport, Western Section, Annual Dinner.—The annual dinner of the Institute of Transport, Western Section, took place on March 3, at the Royal Hotel, Bristol. The President, Brigadier-General Sir H. Osborne Mance, responded to the toast of "The Institute" proposed by Sir Reginald Hill, Chairman, Docks & Inland Waterways Executive. Mr. D. Hawkeswood proposed the toast "The City and Port of Bristol" and Councillor K. A. L. Brown, Vice-Chairman, Port of Bristol Authority, responded. "The Guests" was proposed by Mr. F. D. Arney, and Dr. W. G. Hiscock, Director and General Manager, National Smelting Co. Ltd., responded.

L.M.R. Federation of Horticultural Societies.—The first British Railways, London Midland Region, Federation of Horticultural Societies annual general meeting and dinner to be held since the war was attended by 140 delegates and their wives at Euston on February 24. The annual general meeting was opened by Mr. J. W. Watkins, Operating Superintendent, London Midland Region, in the unavoidable absence of the President of the Council, Mr. John Elliot, Chief Regional Officer. During the meeting the Chairman of the Executive, Mr. H. E. Redfern, paid tribute to the interest displayed in the activities of the Federation by Mr. G. L. Darbyshire, former Chief Regional Officer, who had been President of the Council. At the dinner which followed, the speakers were Mr. J. W. Watkins and Mr. A. E. Hammett, Commercial Superintendent. The L.M.R. Federation of Horticultural Societies has a membership of 10,000. The Honorary General Secretary is Mr. A. S. Clays, care of the Divisional Operating Superintendent, Crewe.

British Railways Boxing Finals.—At the Royal Albert Hall, London, on March 15, the semi-finals and finals of the Railway Executive amateur boxing championships were held. Great keenness was shown in all the contests and many fights were won by a few points. The cup was won by the North Eastern Region with 27 points and the Western Region came second with 17 points. Sir Eustace Missenden, Chairman of the Railway Executive, presented trophies to the winners. Among those present were Mr. J. Benstead, Deputy-Chairman, B.T.C., General Sir Daril Watson, Member of the Railway Executive, Sir Reginald Hill, Chairman of the Docks & Inland Waterways Executive, Mr. G. L. Darbyshire, formerly Chief Regional Officer, London Midland Region, Mr. O. Cromwell, Chief Officer for Labour & Establishment, Southern Region, Mr. J. H. M. Lee, General Assistant to Chief Officer (Staff & Establishment), Railway Executive, and Mr. F. Kelland, President, Associated Society of Locomotive Engineers & Firemen.

Belfast Steamship Company Sailings.—On March 1, the Belfast Steamship Company advanced its sailing times from Belfast and Liverpool by half an hour, so that its ships leave Belfast at 8.30 p.m. and Liverpool at 9.30 p.m. nightly, except Sundays. The ships can use their Liverpool berth in Princess Dock at any state of the tide, due to the new lock arrangement now completed. Previously, the landing stage was used at low tide, and the ships could not enter Princess Dock until high tide. There were then often three ships in service. Now the nightly service in each direction is covered by the two motor vessels *Ulster Monarch* and *Ulster Prince*. Sailing tickets will be required at weekends and certain holidays as follows: *From Belfast*—Each Friday

Sir Eustace Missenden, Chairman of the Railway Executive, presenting the British Railways Amateur Boxing Championship shield to Mr. H. A. Short, Chief Regional Officer, North Eastern Region (see paragraph above)

and Saturday, June 30 to August 19 inclusive, also Mondays, July 31 and August 7. *From Liverpool*—Each Friday and Saturday, June 30 to August 19 inclusive, also Thursday, April 6 (Easter), July 20, July 27, and for each sailing July 31 to August 3 inclusive. Advance bookings may now be made.

Manchester Ship Canal Company.—Presiding at the annual general meeting, on February 24, of the Manchester Ship Canal Company, whose results were given in our February 17 issue, the Chairman, Sir Frederick West, said that the Port of Manchester had achieved a new record of 9,000,000 tons in the volume of traffic. Their revised programme of renewals and maintenance amounted to £2,326,000. They were seeking increased powers to levy tolls and other charges on their canals, and for the services on their railways, so as to cover contingencies such as rising costs or falling traffic; this did not necessarily mean, however, that they would increase the actual charges. The report and accounts were adopted.

Forthcoming Meetings

March 25 (*Sat.*).—Railway Students' Association, London School of Economics & Political Science. Visit to Severn tunnel, depart Paddington Station 9.5 a.m.

March 25 (*Sat.*).—Stephenson Locomotive Society, at British Railways offices, 302, Buchanan Street, Glasgow, at 2.45 p.m. "The 4-4-0 Locomotives of the Southern Region," by Mr. R. A. Savill.

March 25 (*Sat.*).—British Railways, Southern Region, Lecture & Debating Society. Visit to Post Office (London) Tube Railway.

March 29 (*Wed.*).—Permanent Way Institution, London Section, at Denison House, 296, Vauxhall Bridge Road, S.W.1, at 6.30 p.m. "Compressed Air and its Practical Application in Engineering," by Mr. W. J. Ford.

March 29 (*Wed.*).—British Railways, Southern Region, Lecture & Debating Society, at the Chapter House, St. Thomas' Street, London Bridge, at 5.45 p.m. Display of Swiss films, by Mr. H. O. Ernst, London Manager, Swiss National Tourist Office.

March 29 (*Wed.*) to 31 (*Fri.*).—Institute of Metals, annual general meeting in London.

March 30 (*Thu.*).—British Railways, Western Region, London Lecture & Debating Society, in the Clerks' Dining Club, Bishop's Bridge Road, Paddington, at 5.45 p.m. Annual general meeting and young men's discussion.

March 30 (*Thu.*).—Engineers' Guild, Metropolitan Branch, at the Lighting Service Bureau, 2, Savoy Hill, W.C.2, at 6 p.m. "The Objectives and Organisation of the Engineers' Guild," by Mr. J. H. W. Turner, Member of Council.

March 31 (*Fri.*).—Mansion House Association on Transport. Annual general meeting at the Trocadero Restaurant, London, W.1, preceded by a luncheon at 12.30 for 1 p.m.

March 31 (*Fri.*).—Institution of Railway Signal Engineers, at the London Transport Executive Signal School, Earls Court Station, at 6.15 p.m. "Train Description," by Mr. J. E. Mott.

Railway Stock Market

There has been a tendency for buying to centre mainly on all classes of securities unlikely to be affected by home political developments and budget uncertainties. The prevailing City view is that the budget will bring little change in taxation, but that it may increase political controversy.

As regards British Funds, it is contended that the Government is prepared to defend its cheap money policy and that official support for the market would probably be forthcoming if prices reacted sharply; but it is feared that in the next few months there may be a fair amount of selling of British Funds by industrial companies needing increased cash resources to finance larger stocks and the export drive. Owing to uncertainty on the stock exchange, it is hard to raise fresh capital on terms attractive to shareholders; and in any case important new capital issues are being left until after the budget.

The tendency for buying interest in markets to centre on overseas securities benefited foreign rails, though Leopoldina did not hold earlier gains. The terms of the share-out basis for individual Leopoldina stocks are expected to be above current market prices and may show that either the ordinary or preference stocks are well undervalued. Nevertheless, Leopoldina stocks have encountered a fair amount of selling by those who purchased well below current levels, and, as a result, recent buying has had little influence on prices.

Great Western of Brazil shares have responded readily to demand, and are 135s. 9d. at the time of going to press. This is well below the estimate of at least 155s. as the pay-out for the shares already made by the directors, and shows the uncertainty which prevails because, although current prices are probably much undervalued, it may be months before Brazil finally ratifies the take-over agreements for the Leopoldina and Great Western of Brazil.

Leopoldina ordinary have kept at 9, but the preference eased to 25, the 4 per cent. debentures to 92½ and the 6½ per cent. debentures to 132. Leopoldina Terminal £1 ordinary kept at 2s. 9d.; the 5 per cent. debentures came back to 97. San Paulo 10s. units were 13s. 10½d. Manila issues receded, the "A" debentures being 91, the "B" 80½, and the preference shares 10s.

Continued activity in Taltal Railway shares up to 18s. 6d. was attributed to break-up value estimates. Nitrate Rails were 73s. 9d. La Guaira Caracas changed hands at 74 and the 5 per cent. debentures around 87, while Bolivar "A" and "C" debentures were 86 and 53½ respectively. Guayaquil & Quito 5 per cent. first bonds have marked 27½, Costa Rica 6½ per cent. second bonds 23, and Paraguay Central 6½ per cent. "B" income debentures 11¾.

White Pass Yukon 6 per cent. income debentures have continued active up to 75, but Canadian Pacifics came back to 27¾, although the 4 per cent. preference stock was better at 66.

United of Havana stocks were less active, although the 1906 debentures firmed up to 26½ after an earlier small reaction. Antofagasta ordinary and preference were 9 and 47½ respectively.

Road transport shares remained steady helped by the favourable impression created by recent financial results. Southdown kept at 125s., and West Riding were 64s.; but, as usual B.E.T. deferred stock fluctuated sharply and at the time of going to press has reacted to £435.

Steadier conditions have ruled in the iron and steel share market. Hadfields firmed up to 26s. 3d. on the financial results, while Dorman Long were 29s. 6d. Vickers have moved up to 26s. 1½d., though the general belief is that there will be no increase in the cash distribution to shareholders, which means a dividend of 6¼ per cent. on the doubled capital arising from last year's 100 per cent. share bonus.

Locomotive builders' and engineering shares have been slightly more active, with Vulcans at 18s. 1½d. Beyer Peacock 19s. 3d., North British 18s. 6d., and Gloucester Wagon 47s. 6d., G. D. Peters 5s. shares have changed hands around 16s. since publication of the financial results. Charles Roberts were 81s. 3d., Birmingham Wagons 28s. 3d., and Hurst Nelson 58s. 9d. Wagon Repairs 5s. shares were 16s., and Central Wagons 84s. 6d.

Traffic Table of Overseas and Foreign Railways

	Railways	Miles open	Week ended	Traffics for week: Total this year	Traffics for week: Inc. or dec. compared with 1947/48	No. of week	Aggregate traffics to date: Total 1948/49	Aggregate traffics to date: Increase or decrease
				£	£		£	£
South & Central America	Antofagasta ...	811	12.3.50	62,570 –	12,110	10	662,594 –	4,530
	Costa Rica	281	Jan., 1950	c763,908 –	c250,228	31	c5,919,770 –	c1,167,985
	Dorada	70	Jan., 1950	38,097 +	6,448	4	38,097 +	6,448
	Inter. Ctl. Amer. ...	794	Jan., 1950	$1,286,636 +	$196,834	4	$1,286,636 +	$196,834
	La Guaira	22¾	Feb., 1950	$78,787 –	$26,912	8	$157,349 –	$58,645
	Nitrate	382	15.3.50	13,098 –	5,078	11	97,818 +	14,286
	Paraguay Cent. ...	274	10.3.50	£163,291 +	£59,566	36	£5,132,208 +	£1,359,139
	Peru Corp. ...	1,050	Jan., 1950	$6,454,700 +	$1,906,457	31	$40,250,658 +	$13,154,984
	,, (Bolivian Section)	66	Jan., 1950	Bs.9,523,000 +	Bs.838,649	31	Bs.72,392,164 +	Bs. 11,811,706
	Salvador	100	Dec., 1949	c278,000 +	c11,000	26	c730,000 –	c46,000
	Taltal	154	Feb., 1950	12,890 +	1,295	35	103,045 +	34,115
Canada	Canadian National†	23,473	Jan., 1950	11,680,000 –	756,000	4	11,680,000 –	756,000
	Canadian Pacific† ...	17,037	Jan., 1950	9,256,000 –	1,075,000	4	9,256,000 –	1,075,000
Various	Barsi Light* ...	167	Feb., 1950	25,470 –	3,272	48	324,240 +	21,755
	Egyptian Delta ...	607	10.2.50	18,767 –	536	45	592,394 –	43,908
	Gold Coast... ...	536	Jan., 1950	132,620 +	111,046	44	2,313,799 +	169,763
	Mid. of W. Australia	277	Jan., 1950	34,405 +	7,202	31	211,561 +	8,509
	Nigeria	1,900	Dec., 1949	625,316 +	53,236	39	4,515,454 +	254,329
	South Africa ...	13,347	25.2.50	1,411,160 +	1,243	47	69,675,092 +	5,170,859
	Victoria	4,744	Nov., 1949	1,877,684 +	416,841	22	—	—

* Receipts are calculated @ 1s. 6d. to the rupee

† Calculated at $3 to £1